INSTRUCTION MANUAL

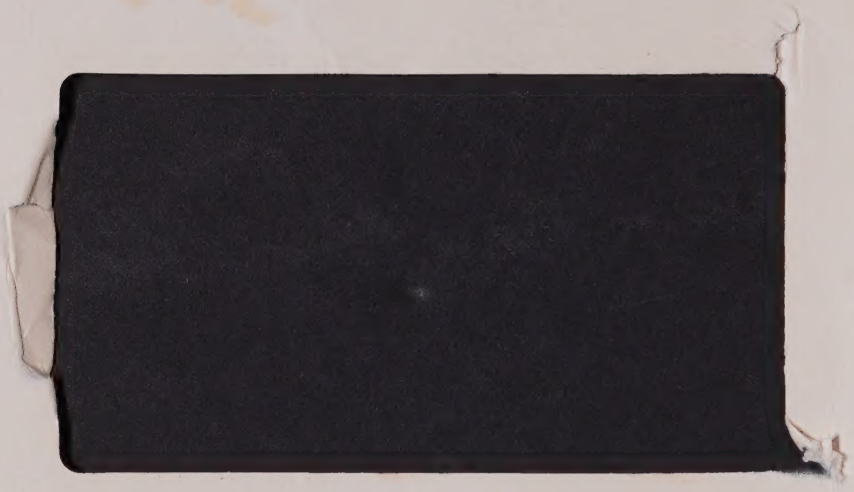
*EMPIRE**

NOISE AND FIELD

INTENSITY METERS

MODELS NF-105 & NF-105/M-126

SINGER
INSTRUMENTATION



INSTRUCTION MANUAL

*EMPIRE**

NOISE AND FIELD

INTENSITY METERS

MODELS NF-105 & NF-105/M-126

Serial No. _____

Manual No. 110-5020

DIFFERENCES IN EQUIPMENT CONFIGURATIONS ARE DETAILED IN APPENDIX

SINGER
INSTRUMENTATION

Precision electrical and electronic instruments for measurement

emc — *EMPIRE** — *Gertsch** — Panoramic* — Sensitive Research*

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1. Model or Type
2. Serial Number
3. Description of trouble(2)
4. Test instruments used
5. Approximate date instrument was placed in operation
6. Approximate number of hours of use
7. Has maintenance action been previously requested?
8. Other comments

Upon receipt of this information our Service Department will send you service data or shipping instructions. Upon receipt of shipping instructions forward the instrument to the factory prepaid. If requested, an estimate of charges will be made before work begins.

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Contact Metrics Division, 3211 S. LaCienega Blvd., Los Angeles, California for *Gertsch* instruments.
Contact Metrics Division, 7338 Varna Ave., N. Hollywood, California for *EMC* instruments.

(2) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken, and any other relevant data.

ADDENDUM

for

MODELS NF-105 & NF-105/M-126

I. PURPOSE.

To incorporate NORMAL-CONVERSION slide switch into tuning unit circuitry so that current tuning units can operate when installed in either current or earlier basic units. The current use of +250 volts results in improved meter linearity.

II. ADDENDUM.

In sheet 2 of figures 5-4 through 5-12, modify the +150 and +250 volt inputs to the tuning unit as illustrated below and listed in the table.

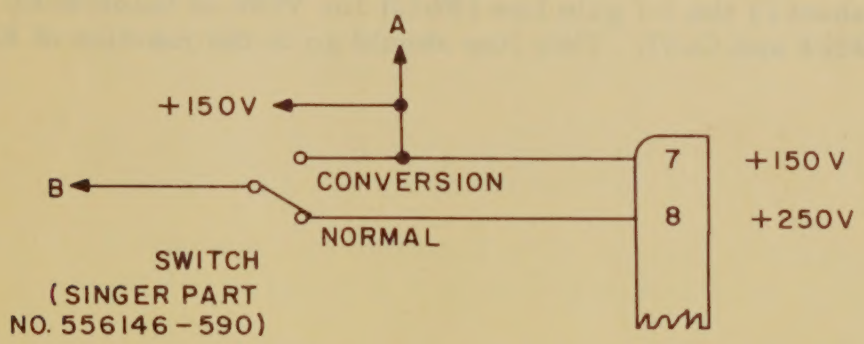


Figure No.	Point A Goes to	Point B Goes to	Switch Ref. Sym. No.
5-4	R993 and junction of S905 and R975	C990	S906
5-5 and 5-6	R773 and junction of R738 and R739	Junction of C840 and C841	S703
5-7	R282, C118 and C142	C226	S3
5-8	R282, C118, C1008 and junction of C142 and R660	C152	S3

Figure No.	Point A Goes to	Point B Goes to	Switch Ref. Sym. No.
5-9	R42, C231 and junction of C6 and R270	C230	S1
5-10	R42, C231, C924 and junction of R661, C6 and R270	C230	S1
5-11 and 5-12	Junction of C668 and C672	C690	S604

In figure 5-4 (sheet 1), that side of C966 shown tied to the junction of C962, C911, S900F-1, and S900G-1 should be tied instead to the junction of C913, S900F-3, and S900G-3. Delete the coaxial cable symbols on the lead joining L915 and S900E.

In figure 5-11 (sheet 2) the i-f gain line (R623) for V606 is incorrectly shown tied to the junction of R622 and C637. This line should go to the junction of R620 and C676.

4285 (16 to 17)
4286 (14 to 15)
4302 (16 to 17)
4371 (28 to 29)
5339 (09 to 10)
4891 (03 to 04)
4892 (03 to 04)
4893 (03 to 04)
4894 (04 to 05)
106-0455 (00 to 01)

ADDENDUM

FOR

MODEL T-1/NF-105 TUNING UNIT
(EFFECTIVE ON SERIAL NO. U-10853 AND UP)

I. PURPOSE.

To increase sensitivity of Model T-1/NF-105 Tuning Unit so that it is compatable with the Model PA-210 Spectrum Signature Panadaptor.

II. ADDENDUM.

a. Delete R53 from the 65- to 200-MHz tuner in figure 5-7, sheet 1(page 5-25/5-26). Replace resistor with a jumper wire.

b. Add "Used in M-126 only" after R53 entry in table 6-5.

ADDENDUM

for

MODELS NF-105 AND NF-105/M-126

(Effective S/N U10824 through U10852, U10868 through U10889, U10908 through U10920 and (U13420 and up)

I. PURPOSE.

To update instruction manual to reflect latest equipment modification.

II. ADDENDUM.

Incorporate the following changes into the instruction manual.

a. In table 1-12:
(1) Change V17 (Models T-1/NF-105 and T-1/NF-105/M-126 Tuning Units) tube type from 6BJ6 to 6CB6A.

(2) Change V7 (Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units) tube types from 6BJ6 to 6CB6A.

(3) Change both V609 and V610 (Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units) tube types from 6BJ6 to 6CB6A.

b. Change the fifth sentence of paragraph 3-33 to read: "Tunable transformer T10 tunes the cathode circuit of V17...."

c. Change the fifth sentence of paragraph 3-38 to read: "Tunable transformer T4 tunes the cathode circuit of V7...."

d. Change the fifth sentence of paragraph 3-43 to read: "Tunable transformer T601 tunes the cathode circuit of V610...."

e. Change the chassis screening for V17 in figures 4-10 and 4-11, V7 in figure 4-20, and V609 and V610 in figures 4-22 and 4-23 to read 6CB6A.

f. Change the chassis screening for L628 in figures 4-22 and 4-23 to read T601.

g. Change the first senctence of paragraph 4-33. c. to read: "Alternately adjust transformers T5 and T7 through T10 to peak the output meter indication."

h. Change the note following paragraph 4-33. c. to read: ".... downscale, adjust T10 until the pointer drops downscale and repeat step c."

i. Change the last sentence of paragraph 4-33. h. to read: "Adjust T10 to obtain a maximum output meter indication."

j. Change the first sentence of paragraph 4-34. a. to read: "Alternately adjust transformers T5, T7, T8 and T9, coils L1000 and L1001 and transformer T10 to peak the output meter indication."

k. Change the note following paragraph 4. 34. a. to read: "..... downscale, adjust T10 until the meter pointer drops downscale and repeat step a."

l. Change the note followng paragraph 4-38. c. to read: "..... downscale, adjust T4 until the meter pointer drops downscale and repeat step a."

m. Change paragraph 4-38. m. to read: "....terminals, adjust T4 to peak the meter indication."

n. Change the note following paragraph 4-38. m. to read: "Due to interaction between T4 and L11, it will be necessary to retune L11 (see step e) and T4 until optimum response is obtained."

o. Change the note following paragraph 4-39. a. to read: ".... downscale adjust T4 until the meter pointer drops downscale and repeat step a."

p. Change the note folloiwng paragraph 4-42. e. to read: ".... down-scale, adjust T601 until the meter pointer drops down-scale and repeat steps d and e."

q. Change paragraph 4-42. m. to read: "...terminals, adjust T601 to peak the meter indication."

r. Change the note following paragraph 4-43. a. to read: ".... downscale, adjust T601 until the meter pointer drops downscale and repeat step a."

s. Change the circuitry of V17 in figures 5-7 (sheet 2 of 2) and 5-8 (sheet 2 of 2) as illustrated in figure A.

t. Change the values of R21 and R25 in figure 5-9 (sheet 2 of 2) from 220 to 100 and change the circuitry of V7 as illustrated in figure A.

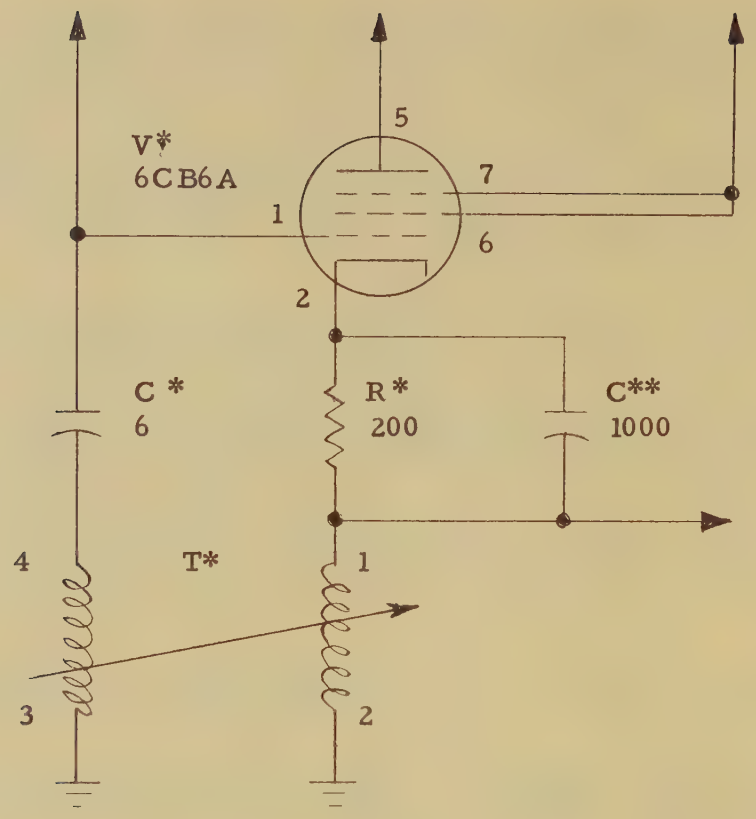
u. Change the values of R907, R21 and R25 in figure 5-10 (sheet 2 of 2) from 220 to 100. Also change the circuitry of V7 as illustrated in figure A.

v. Change the values of R624, R630 and R639 in figure 5-11 (sheet 2 of 2) from 390 to 200. Also delete R658, R659, and R643. Change the value of R642 from 390 to 150. Change the tube type of V609 from 6BJ6 to 6CB6A. Change the value of C669 from 15 to 10. Change C649D to read C670. Change C670 to read C649D. Add R664 (10 ohms) between C696 and the junction of V610-5, V610-6, V610-7 and R653. Change the circuitry of V610 as illustrated in figure A.

w. Change the values of R928, R630 and R639 in figure 5-12 (sheet 2 of 2) from 390 to 200. Also delete R659 and R643. Change the value of R642 from 390 to 150. Change the tube type of V609 from 6BJ6 to 6CB6A. Change the value of C669 from 15 to 10. Change C670 to read C648D. Change C648D to read C670. Add R664 between C696 and the junction of V610-5, V610-6, V610-7 and R653. Change the circuitry of V610 as illustrated in figure A.

x. Delete the entry for L47 in table 6-5 and add the following items.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C229	CAPACITOR, FIXED, DIPPED MICA, 6PF, PORM 0.5PF, 500 V Singer P/N150-2002-6R0CD0	DM15C6R0D0500WV 4CR	72136	1
R185	RESISTOR, FIXED, COMP., 200 OHMS, PORM 5 PCT, 1/2 W Singer P/N 151-1003-201J	EB2015	01121	1
T10	TRANSFORMER, VARIABLE	103-1520-001	16665	1
V15 AND V16	ELECTRON TUBE Singer P/N 556027-200	6BJ6	81349	2
V17	ELECTRON TUBE Singer P/N 556027-160	6CB6A	81349	1



	Tuning Unit		
	T-1/NF-105 and T-1/NF-105/M-126	T-2/NF-105 and T-2/NF-105/M-126	T-3/NF-105 and T-3/NF-105/M-126
V*	V17	V7	V610
C*	C229	C229	C638
R*	R185	R29	R647
C**	C150	C48	C673
T*	T10	T4	T601

Figure A

y. Delete the entry for L16 in table 6-6 and add the following items.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C229	CAPACITOR, FIXED, DIPPED MICA, 6 PF, PORM 0.5PF, 500 V Singer P/N150-2002-6R0CDO	DM15C6R0CDO500 WV4CR	72136	1
R21	Same as R9			
R25	Same As R9			
R29	RESISTOR, FIXED, COMP., 200 OHMS, PORM 5 PCT, 1/2 W Singer P/N 151-1003-201J	EB2015	01121	1
R907	Same as R9			
R914	RESISTOR, FIXED, COMP., 220 OHMS, PORM 5 PCT, 1/2 W Singer P/N 151-1003-221J	EB2215	01121	1
T4	TRANSFORMER, VARIABLE	103-1519-001	16665	1
V4 thru V6	Same as V3/STD			
V7	ELECTRON TUBE Singer P/N 556027-160	6CB6A	81349	1

z. Delete the entry for C630, L628, R643, R658 and R659 in table 6-7 and add the following items.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C638	CAPACITOR, FIXED, DIPPED MICA, 6 PF, PORM 0.5 PF, 500 V Singer P/N150-2002-6R0CDO	DM15E6R0CDO500 WV4CR	72136	1
C669	CAPACITOR, FIXED, CERAMIC, 10 PF, PORM 10 PCT, 500 V Singer P/N556060-112	CC20CH100K	81349	1

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R624	RESISTOR, FIXED, COMP., 200 OHMS, PORM 5 PCT, 1/2 W Singer P/N 151-1003-201J	EB2015	01121	2
R628	Same as R624 (USED IN M-126 ONLY)			
R630	Same as R624			
R639	Same as R624			
R642	Same as R622			
R647	Same as R624			
R664	Same as R611			
T601	TRANSFORMER, VARIABLE	103-1518-001	16665	1
V609 and V610	ELECTRON TUBE Singer P/N 556027-160	6CB6A	81349	1

4285 16 to 19
4892 03 to 05
4286 14 to 16
4893 03 to 05
4302 16 to 18
4894 04 to 06

Addendum No. E 39

ADDENDUM

for

MODEL BA-105 and BA-105/M-126

(Effective Serial No. U13368 and above)

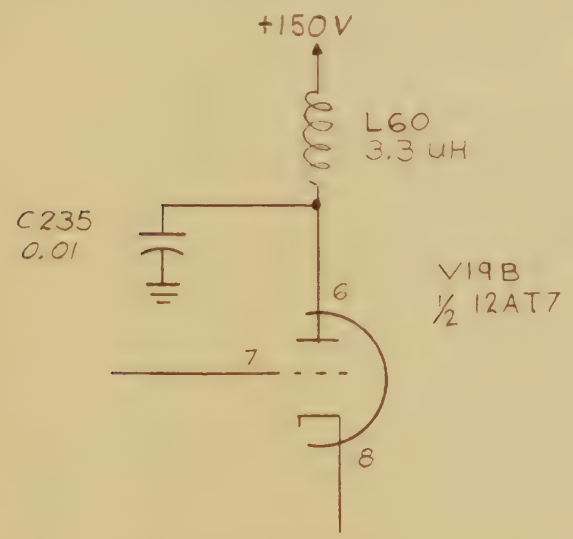
I. PURPOSE.

To reduce spurious reponses when used with T-2/NF-105/M-126.

II. ADDENDUM.

a. Add capacitor C234, 0.05 microfarad between jack J16-6 and ground.

b. Change Figure 5-2 as indicated below



c. Make the following changes to table 6-2 List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C234	CAPACITOR, FIXED, CERAMIC DISC, 0.05 UF, PLUS 80 PCT, MINUS 20 PCT, 200 V Singer P/N 556074-057	33C137	56289	1
C235	SAME AS C159			
L60	INDICTOR, 3.3UH Singer P/N 556012-154	1840-18	99800	1

ADDENDUM

for

MODEL BA-105 and BA-105/M-126

Make the following changes to table 6-2 List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C72	CAPACITOR, FIXED, CERAMIC DISC, 0.01 UF, GMV, 500 V Singer P/N 150-1002-103PHF	TYPE 871	72982	1
J5 and J6	CONNECTOR, JACK Singer P/N 168-4018-002	UG 290A/U	81349	1

Addendum No. E42

ADDENDUM

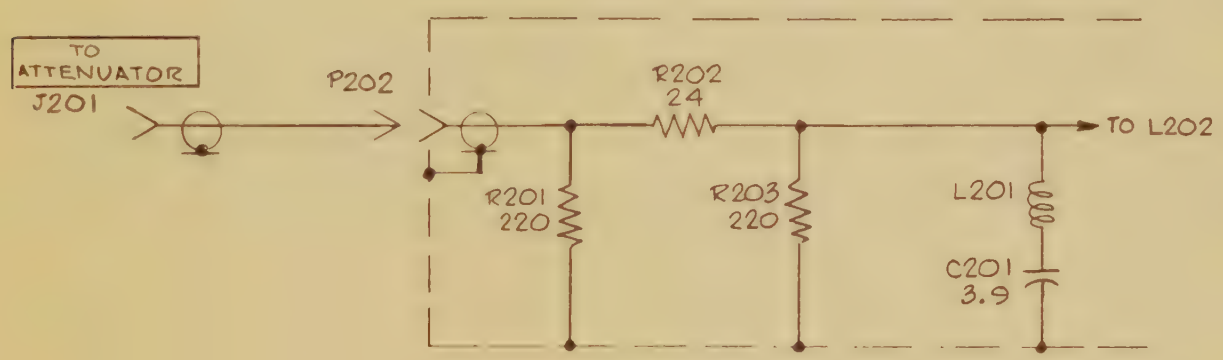
for

MODEL T-2/NF-105 TUNING UNIT

(Effective on Serial No. U15189 and up)

1. Change the second sentence of paragraph 3-36 to read: "The low-pass filter in the T-2/NF-105 Tuning Unit also includes a 4 dB pi-section resistive attenuator pad to keep the input VSWR at a low value."

2. In figure 5-9, (sheet 1 of 2), change the schematic diagram of FL2 as illustrated below:



Addendum No. E 43
(4286 17 to 18)

ADDENDUM

for

MODEL T2/NF-105

(Effective Serial No. U15189 and above)

Make the following changes to the schematic and List of Replaceable Parts.

1. On figure 5-9 (sheet 2 of 2) change the value of C26 to 0.05uf.

2. In table 6-6, page 6-44 make the following change.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C26	CAPACITOR, FIXED, CERAMIC DISC, 0.05UF, PLUS 80 PCT, MINUS 20 PCT, 200 V Singer P/N 556074-057	33C137	56289	1

Addendum No. E45

ADDENDUM

for

MODEL BA/NF-105

(Effective on Serial No. U15239 and Above)

1. Make the following changes to the List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
V18	ELECTRON TUBE Singer P/N 556146-963	6AL5	03507	1

2. Add the following to Table 6-1 Manufacturer's Code.

MANUFACTURER'S CODE

Number	Name
03507	General Electric Co. Tube Division Syracuse, New York

Addendum No. E46

ADDENDUM

for

MODELS NF-105 and NF-105/M-126

I. PURPOSE.

To correct errors in existing manual.

II. ADDENDUM.

1. In table 1-8 (page 1-8), change the image and i-f rejection specification of the T-A/NF-105 and T-A/NF-105/M-126 Tuning Units to read:

"Better than 38 dB (image)"
"Better than 48 dB (i-f)"

2. In table 4-3 (page 4-21), step 6b, change Sig. Gen. Output Level of T-A/NF-105 and T-A/NF-105/M-126 from "2.5mV" to "0.8mV".

3. In table 4-3 (pages 4-22 and 4-23), step 8, change the signal generator output level from 0.1 volt rms to 10uV rms. The corresponding nominal pre i-f output levels should be:

Tuning Unit	Pre i-f Output
T-X/NF-105 and T-X/NF-105/M-126	10 uV
T-A/NF-105	100 uV
T-1/NF-105	9 uV
T-2/NF-105	0.8 uV
T-3/NF-105	1 uV
T-A/NF-105/M-126	150 uV
T-1/NF-105/M-126	18 uV
T-2/NF-105/M-126	1.2 uV
T-3/NF-105/M-126	1 uV

4. In table 4-3 (page 4-23), steps 9 and 11, change the signal generator output level from 10uV to 1000uV.

5. In table 4-3 (page 4-24), step 12, change the signal generator output level from 10uV to 1000uV and change the acceptable indication to read 4.2V peak-to-peak (nominal).

ADDENDUM

for

MODELS NF 105 and NF-105/M 126

I. PURPOSE.

To correct errors in existing manual.

II. ADDENDUM.

1. In table 1-12, change the diode type of CR1 (Model T-1/NF-105/M-126 Tuning Unit), CR2 (Model T-2/NF-105/M-126 Tuning Unit) and CR3 (Model T-3/NF-105/M-126 Tuning Unit) from 1N3005 to 1N3005R.

2. In examples 1 and 2 on page 2-30, change the cable attenuation factor reference from figure 2-21 to figure 2-23.

3. In the example on page 2-33, change the cable attenuation factor reference from figure 2-21 to figure 2-23 and change the antenna factor reference from figure 2-14 to figure 2-15.

4. In figure 2-18, delete the note.

5. a. In figure 5-8 (sheet 1), change CR1 diode type to 1N3005R.
   b. In figure 5-10 (sheet 1), change CR2 diode type to 1N3005R.
   c. In figure 5-12 (sheet 1), change CR3 diode type to 1N3005R.

6. a. In table 6-5, change CR1 manufacturer's part number to 1N3005R.
   b. In table 6-6, change CR2 manufacturer's part number to 1N3005R.
   c. In table 6-7, change CR3 manufacturer's part number to 1N3005R.

ADDENDUM

for

MODEL TX/NF-105 and TX/NF-105/M-126

Make the following changes to the List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C993	SAME AS C908			

Addendum No. E 49

ADDENDUM

for

MODELS TA/NF-105 & TA/NF-105/M-126

Make the following changes to the List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
A6	TUNER BAND 6, 12.7 to 30 MEGAHERTZ	103-1195-001	16665	1

Addendum No. E 54

ADDENDUM

for

MODEL T2/NF-105 & T2/NF-105/M-126

Make the following changes to the List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C9	CAPACITOR, FIXED, MICA, 100PF, PORM 5 PCT, 500V Singer P/N 556078-012	CM15C101J	72136	1
C10	CAPACITOR, FIXED, MICA, 100PF, PORM 5 PCT, 500V Singer P/N 556125-066	652-005-100 PF5PCT	72982	1

Addendum No. E55

ADDENDUM

for

MODEL T-1/NF-105

1. On figure 5-7 (Sheet 1), make the following changes.

   a. Change value and reference symbol number of R61 to R71 - 1K ohms.

   b. Add resistor R61, 47 ohms from pin 8 of V13B to the junction of R71 and R67.

   c. Add capacitor C153, 1000pf from pin 7 of V13B to the junction of R71 and R67.

   d. Change value of C83,"15pf" to C83, "10pf".

2. On figure 5-7 (Sheet 2), make the following change.

   a. Change R286, "75 ohms" to R286, "22 ohms".

3. Make the following changes to Table 6-5 of the Replaceable Parts List.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C83	CAPACITOR, FIXED, CERAMIC, DIELECTRIC, 10PF, PORM 1 PF, 500V Singer Part No. 556060-112	CC20CH100F	81349	1
C115	CAPACITOR, FIXED, CERAMIC, DIELECTRIC, 15PF, PORM 1 PCT, 500V Singer Part No. 556060-115	CC20CH150K	81349	1
C153	Same as C76			
R61 and R62	Same as R45			
R71	Same as R46			
R286	RESISTOR, FIXED, COMP., 22 OHMS, PORM 5 PCT,1/2W Singer Part No. 151-1003-220J	EB2205	01121	1

ADDENDUM

for

MODEL NF-105 & NF-105/M-126

Make the following changes to the List of Replaceable Parts.

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L609	CHOKE, RF	009429-001	16665	1
L611	SAME AS L609			
L614	SAME AS L609			

Addendum No. E60

ADDENDUM

for

MODELS NF-105 & NF-105F

1. On figure 5-10 (Sheet 1), make the followings changes.

   a. Delete C16
   b. Change the value of C9 from "100" to "62"

2. On figure 5-10 (Sheet 2), make the following changes.

   a. Change the value of R171 and R204 from "150" to "1K"
   b. Add capacitor C236, 0.05 to ground, between the junction of R171 and C230
   c. Change V3 from "6BJ6" to 6CB6A"
   d. Add resistor R916, 10 from Pin 1 of V3 to the junction of T1 and C61.

3. Make the following changes to table 6-6 List of Replaceable Parts.

   a. Delete C16
   b. Change table 6-6 as follows:

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C9	CAPACITOR, FIXED, MICA, 62 PF, PORM 5 PCT, 500 V SINGER PART NO. 150-2002-620EJO	DM15E620JO 500WV4CR	72136	1
C10	CAPACITOR, FIXED, MICA, 100 PF, PORM 5 PCT, 500 V SINGER PART NO. 556078-012	CM15C101J	72136	1
C236	CAPACITOR, FIXED, CERAMIC, 0.05UF, GMV, 500 V SINGER PART NO. 150-1002-503	85100025V 503PF500V	72982	1
R171	RESISTOR, FIXED, COMP., 1K OHM, PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	1
R204	SAME AS R171			
R916	SAME AS R255			
V3	ELECTRON TUBE, SINGER PART NO. 556027-160	6CB6A	81349	1
V4 THRU V7	ELECTRON TUBE, SINGER PART NO. 556027-200 (Use in Std Only)	6BJ6	81349	3

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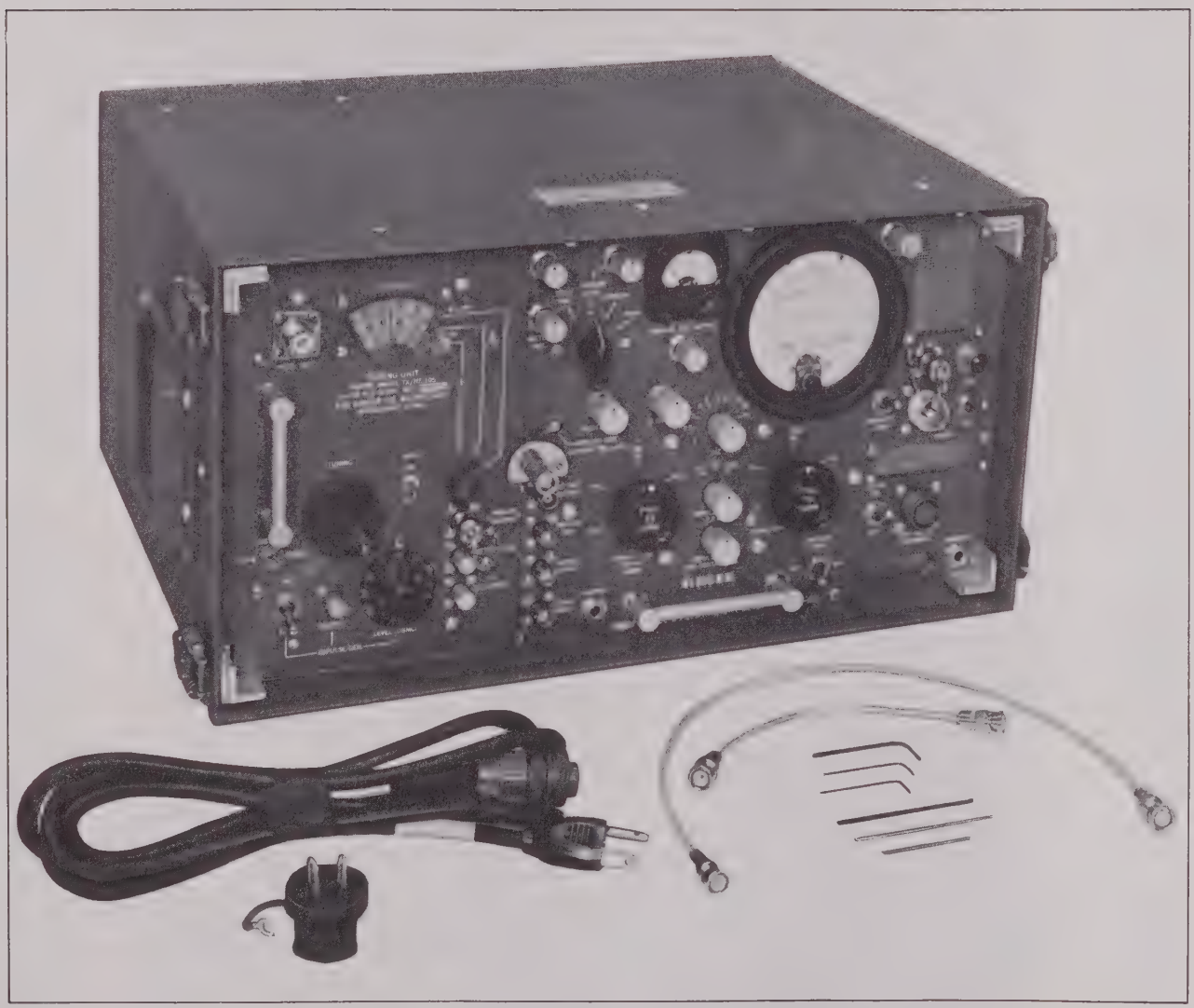

Figure 1-1. Model NF-105 Noise and Field Intensity Meter

SECTION I
INTRODUCTION

1-1. SCOPE OF MANUAL.

1-2. This instruction manual provides operating and maintenance information for the EMPIRE* Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters, manufactured by The Singer Company - Metrics Division. Included in this manual are a general description of the Models NF-105 and NF-105/M-126 and available optional accessories, operating instructions, theory of operation, maintenance information and data, schematic diagrams and a repair parts list. The Model NF-105, less optional accessories, is illustrated in figure 1-1.

1-3. The information contained in this manual refers to the standard version of the Models NF-105 and NF-105/M-126 and is current only to the date of publication. Differences in equipment components, specifications and performance resulting from The Singer Company's continuous product improvement program or customer design and application requirements are described in addendum sheets.

1-4. PURPOSE AND USE OF THE EQUIPMENT.

1-5. The Models NF-105 and NF-105/M-126 are designed to measure the frequency and level of electromagnetic energy within the frequency range from 14 kHz to 1000 MHz in accordance with standard military and commercial specifications. Some typical applications are listed below.

a. Field intensity measurements.

b. Sensitive tunable r-f vtvm.

c. Antenna pattern analysis.

d. Determination of harmonic and/or spurious frequency of transmitter outputs.

e. Determination of shielding effectiveness.

f. Measurement of radiation from a component, system or vehicle.

g. Measurement of r-f current in a conductor or group of conductors.

h. Measurement of receiver local oscillator radiation.

i. Determining the effectiveness of r-f suppression on sources of r-f interference.

j. Evaluating the area of useful transmitter coverage.

k. Measurement of the electromagnetic field surrounding a power or r-f conductor.

l. Studying communication conditions at a given site by recording atmospheric noise versus time.

m. Determining effects of electromagnetic environment upon electronic equipment in terms of degradation and failure as intensity of environment becomes more severe.

n. Measuring the intensity of r-f pulses which are sporadic or which occur at low repetition rates.

o. Measuring the strength of r-f interference voltages in electrical interconnecting, control and power distribution leads.

p. Analyzing band pass, band rejection and discriminating characteristics of electronic components, circuitry and systems.

q. Measuring broad band and pulsed r-f interference.

1-6. Inquiries are invited regarding special applications of the Models NF-105 and NF-105/M-126 to particular requirements. Such inquiries should be directed to the attention of the Applications Engineering Department.

1-7. GENERAL DESCRIPTION.

1-8. The Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters are single-conversion superheterodyne receivers employed to measure the frequency and intensity of electromagnetic energy within the frequency range from 14 kHz to 1000 MHz through the use of five interchangeable plug-in tuning units.

1-9. Circuits and components common to all frequency ranges (such as calibrated r-f step attenuator, impulse generator calibrator, peak and average reading vtvm, video detector, audio detector and amplifier and the power supplies) are housed in the Basic Measuring Unit. This feature eliminates the costly repetition of components and circuits and

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permits the user to purchase only those tuning units required for his particular applications.

1-10. The plug-in tuning units employed in both the Models NF-105 and NF-105/M-126 are equipped with tuned circuits preceding the first r-f amplifier, thereby greatly reducing the possibility of pulse overload and cross modulation. All tuned circuitry is well tracked to provide rapid frequency scanning by means of a single tuning control. The wide dynamic range of the equipment is achieved through the use of well-designed linear i-f amplifiers. Automatic gain control (AGC) is not employed in order to avoid the need for recalibration in the event of a failure of a component within the AGC loop.

1-11. Carrier or peak measurements of CW or modulated CW signals are made using the front panel meter calibrated in both microvolts and dB above 1 microvolt. The peak indication of broad band signals is achieved by either the direct-reading or aural slideback technique and the signal strength is evaluated directly in dB above 1 microvolt/MHz.

1-12. An output is provided for direct connection to either a remote indicator or an external recorder. Provision for X-Y plotting is supplied, where an analog X-output voltage varying as a linear function of frequency is furnished as the X-coordinate output and the incoming signal strength provides the Y-coordinate information. Both post i-f and pre i-f outputs are provided for spectrum signature analysis in conjunction with an EMPIRE Model PA-210 Spectrum Signature Panadaptor. Video and audio outputs are also provided for examination of signal modulation by means of an oscilloscope or a 600-ohm headset, respectively.

1-13. EQUIPMENT SUPPLIED AND AVAILABLE OPTIONAL ACCESSORIES.

1-14. The equipment supplied consists of either the Model BA-105 or BA-105/M-126 Basic Measuring Unit (as ordered), one or more plug-in tuning units (as ordered), an instruction manual and an accessory kit. (See table 1-1.)

1-15. Optional accessories for use in conjunction with the equipment are available. These accessories are described in paragraphs 1-16 through 1-21.

1-16. STANDARD ACCESSORY KIT KT-105-D. The KT-105-D Standard Accessory Kit (see table 1-2) contains the accessories necessary for operation over the frequency range from 20 to 1000 MHz. Note that any item in the kit may be ordered separately as required.

1-17. ANTENNA EQUIPMENT KIT LM-105. The LM-105 Antenna Equipment Kit contains the accessories required for operation over the frequency range from 150 kHz to 30 MHz (see table 1-3). Note that any item in the kit may be ordered separately as required.

TABLE 1-1. EQUIPMENT SUPPLIED

Nomenclature	Singer Part Number
Model BA-105 Basic Measuring Unit*	101-0030-001
Model BA-105/M-126 Basic Measuring Unit*	101-0030-002
Model T-X/NF-105 Tuning Unit*	101-0055-001
Model T-X/NF-105/M-126 Tuning Unit*	101-0055-002
Model T-A/NF-105 Tuning Unit*	101-0056-001
Model T-A/NF-105/M-126 Tuning Unit*	101-0056-002
Model T-1/NF-105 Tuning Unit*	101-0057-001
Model T-1/NF-105/M-126 Tuning Unit*	101-0057-002
Model T-2/NF-105 Tuning Unit*	101-0058-001
Model T-2/NF-105/M-126 Tuning Unit*	101-0058-002
Model T-3/NF-105 Tuning Unit*	101-0059-001
Model T-3/NF-105/M-126 Tuning Unit*	101-0059-002

*Supplied only as ordered.

(Cont'd)

TABLE 1-1. EQUIPMENT SUPPLIED (Cont'd)

Nomenclature	Singer Part Number
Instruction Manual	110-5020
Accessory Kit (consisting of items 1 through 9)	102-0076-001
1. 6-Inch Patch Cable	556161-600
2. 18-Inch Patch Cable	556161-595
3. AC Line Cord with Adapter Plug	102-9125-001 556010-230
4. #4 Allen Wrench	556005-122
5. #6 Allen Wrench	556005-123
6. #8 Allen Wrench	556005-124
7. #10 Allen Wrench	556005-125
8. #4 Spline Wrench	556005-012
9. #6 Spline Wrench	556005-011

TABLE 1-2. MODEL KT-105-D STANDARD ACCESSORY KIT COMPONENTS

Nomenclature	Singer Part Number
Model KT-105-D Standard Accessory Kit (consisting of items 1 through 18 below)	102-0004-001
1. AC-105-C Accessory Carrying Case	556001-276
2. DM-105-T1 Dipole Antenna (20 to 140 MHz) including 2 Telescoping Dipole Elements	102-0005-001 00-009524-001
3. DM-105-T2 Dipole Antenna (140 to 400 MHz) including 2 Telescoping Dipole Elements	102-0006-001 00-009523-001
4. DM-105-T3 Dipole Antenna (400 to 1000 MHz)	102-0007-001
5. Megahertz Tape (for use with DM-105-T1 and DM-105-T2 Dipole Antennas)	556001-324
6. Megahertz Rule (for use with DM-105-T3 Dipole Antenna)	00-004317-001
7. Clamp Block	102-0029-001
8. MS-105-A Antenna Mast Socket	00-004459-001
9. CB-105 30-Foot R-f Cable Pair	102-0012-001

Note: Items 2 through 9 are housed in item 1.

(Cont'd)

TABLE 1-2. MODEL KT-105-D STANDARD ACCESSORY KIT COMPONENTS (Cont'd)

Nomenclature	Singer Part Number
10. LL-105 50-Ohm Line Probe	102-0039-001
11. MP-105 Magnetic Field Probe	102-0010-001
12. EP-105-A Electric Field Probe	102-0011-001
13. EA-105 600-Ohm Earphones	556001-200
14. GR-105 Grounding Strap	102-0014-001
15. BG-105 Tripod Bag	556001-288
16. TP-105-A Tripod	556001-287
17. MA-105 Antenna Mast Sections (3)	102-0015-001
18. TC-105 Tuning Unit Carrying Case	556001-278

Notes: 1. Items 10 through 14 are housed in item 1.
2. Items 16 and 17 are housed in item 15.

TABLE 1-3. MODEL LM-105 ANTENNA EQUIPMENT KIT COMPONENTS

Nomenclature	Singer Part Number
Model LM-105 Antenna Equipment Kit (consisting of items 1 through 7 below)	102-0072-001
1. LC-105 Acessory Carrying Case	556001-277
2. VA-105 Vertical Antenna Base with Telescoping 41-Inch Antenna Whip	102-0027-001 004155-001
3. LP-105 12-Inch Loop Antenna	102-0026-001
4. LO-105 Magnetic Field Probe	102-0034-001
5. LA-105 50-Ohm Line Probe	102-0009-001
6. LF-105 500-Ohm Line Probe	102-0031-001
7. PA-105 High-impedance Binding Post	102-0035-001

Note: Items 2 through 7 are housed in item 1.

1-18. ANTENNA EQUIPMENT KIT LM-105-SC. The LM-105-SC Antenna Equipment Kit (see table 1-4) contains the accessories required for operation over the frequency range from 150 kHz to 30 MHz when employing the series calibration technique. Note that any item in the kit may be ordered separately as required.

1-19. ANTENNA EQUIPMENT KIT LX-105. The LX-105 Antenna Equipment Kit (see table 1-5) contains the accessories necessary for operation over the 14 to 150 kHz frequency range. Note that any item of the kit may be ordered separately as required.

1-20. ANTENNA EQUIPMENT KIT LX-105-SC. The LX-105-SC Antenna Equipment Kit (see table 1-6) contains the accessories necessary for operation over the frequency range from 14 to 150 kHz when employing the series calibration measurement technique. Note that any item in this kit may be ordered separately as required.

1-21. ADDITIONAL OPTIONAL ACCESSORIES. Additional accessories, which are not furnished as part of a kit, are optionally available. These accessories are listed in table 1-7.

1-22. EQUIPMENT SPECIFICATIONS.

1-23. The specifications of the Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters are listed in table 1-8.

1-24. ELECTRON TUBE, CRYSTAL DIODE, FUSE AND INDICATOR LAMP COMPLEMENT.

1-25. The entire complement of electron tubes and crystal diodes employed in both the Models NF-105 and NF-105/M-126 are listed in table 1-12. The fuses and indicator lamps employed are listed in table 1-13.

TABLE 1-4. MODEL LM-105-SC ANTENNA EQUIPMENT KIT COMPONENTS

Nomenclature	Singer Part Number
Model LM-105-SC Antenna Equipment Kit (consisting of items 1 through 6 below)	103-0325-001
1. LC-105 Accessory Carrying Case	556001-277
2. VA-105-SC Vertical Antenna Base with Vertical Antenna Adaptor and Vertical Antenna Sections (5)	102-0027-002 004132-001 556001-260
3. LP-105-SC 12-Inch Loop Antenna	102-0026-001
4. LO-105 Magnetic Field Probe	102-0034-001
5. LA-105 50-Ohm Line Probe	102-0009-001
6. LF-105 500-Ohm Line Probe	102-0031-001

Notes: 1. Items 2 through 6 (less Vertical Antenna Sections) are housed in item 1.
2. Vertical Antenna Sections are packaged separately.

TABLE 1-5. MODEL LX-105 ANTENNA EQUIPMENT KIT COMPONENTS

Nomenclature	Singer Part Number
Model LX-105 Antenna Equipment Kit (consisting of items 1 through 4 below)	102-0051-001
1. XC-105 Accessory Carrying Case	556001-283
2. LG-105-A 36-Inch Loop Antenna	102-0018-002
3. VX-105 41-Inch Vertical Antenna	102-0041-001
4. LB-105 50-Ohm Line Probe	102-0009-003

Note: Items 2 through 4 are housed in item 1.

TABLE 1-6. MODEL LX-105-SC ANTENNA EQUIPMENT KIT COMPONENTS

Nomenclature	Singer Part Number
Model LX-105-SC Antenna Equipment Kit (consisting of items 1 through 4 below)	102-0051-001
1. XC-105 Accessory Carrying Case	556001-283
2. LG-105-SC 36-Inch Loop Antenna	-
3. VR-3-105 9-Foot Vertical Antenna Base with Vertical Antenna Adaptor and Vertical Antenna Sections (5)	02-1664-001 004132-001 556001-260
4. LB-105 50-Ohm Line Probe	102-0009-003

Note: Items 2 through 4 are housed in item 1.

TABLE 1-7. ADDITIONAL OPTIONAL ACCESSORIES

Nomenclature	Singer Part Number
OC-105 Optional Equipment Carrying Case	556001-279
VR-1-105 41-Inch Telescoping Vertical Antenna (14 to 150 kHz)	102-0021-001
BB-105 Broad Band Discone Antenna (20 to 1000 MHz) with Antenna Sections (6)	00-002472-001 556001-260
GP-105 Ground Plane (for use with VR-1-105 and BB-105 antennas)	102-0022-001
LP-3-105 36-Inch Loop Antenna (150 kHz to 12 MHz)	102-0018-001
LH-105 500-Ohm Line Probe (20 to 1000 MHz)	102-0039-002
CP-105 Clamp-on Probe (14 kHz to 100 MHz)	102-0028-001
MD-105-T1 Broad Band Dipole Antenna (20 to 200 MHz)	102-0047-001
UN-105 Unbalanced Injection Block (for use with BB-105 antenna)	102-0032-001
AT-60-40-BNC Attenuator	-
RA-105 Corner Reflector Antenna (400 to 1000 MHz)	102-0038-001
Corner Reflector Case	556001-280
Megahertz Rule (for use with RA-105 antenna)	00-3895-001
RE-105-AX Remote Indicator	102-0024-001
RC-105-X 30-Foot Remote Indicator Cable	102-0025-001
AH-105 Alignment Harness	102-0003-001
F-A/NF-105 Tunable Rejection Filter (150 kHz to 30 MHz)	101-0049-001
F-1A/NF-105 Tunable Rejection Filter (20 to 65 MHz)	101-0054-001
F-1B/NF-105 Tunable Rejection Filter (65 to 200 MHz)	101-0053-001

(Cont'd)

TABLE 1-7. ADDITIONAL OPTIONAL ACCESSORIES (Cont'd)

Nomenclature	Singer Part Number
F-2/NF-105 Tunable Rejection Filter (200 to 400 MHz)	101-0048-001
ST-31A Stub Tuner (400 to 1000 MHz)	101-0121-001
SU-105 Switching Unit	101-0051-001
TP-105-R Ruggedized Tripod	102-0050-001
MO-12-105 Inverter (12 VDC/115 VAC)	101-0052-001
MO-24-105 Inverter (24 VDC/115 VAC)	101-0050-001
DC-105 DC Supply Cord	102-0017-001
MC-105 Basic Measuring Unit Transit Case	556001-290

TABLE 1-8. MODELS NF-105 AND NF-105/M-126 SPECIFICATIONS

Parameter	Specification				
	T-X/NF-105 and T-X/NF-105/M-126 Tuning Units	T-A/NF-105 and T-A/NF-105/M-126 Tuning Units	T-1/NF-105 and T-1/NF-105/M-126 Tuning Units	T-2/NF-105 and T-2/NF-105/M-126 Tuning Units	T-3/NF-105 and T-3/NF-105/M-126 Tuning Units
Receiver type	Single-conversion superheterodyne				
Frequency Range	14 kHz to 150 kHz covered in three bands Band 1: 14 to 25 kHz Band 2: 25 to 62 kHz Band 3: 62 to 150 kHz	150 kHz to 30 MHz covered in six bands Band 1: 0.15 to 0.36 MHz Band 2: 0.36 to 0.87 MHz Band 3: 0.87 to 2.1 MHz Band 4: 2.1 to 5.2 MHz Band 5: 5.2 to 12.7 MHz Band 6: 12.7 to 30 MHz	20 MHz to 200 MHz covered in two bands Band 1: 20 to 65 MHz Band 2: 65 to 200 MHz	200 MHz to 400 MHz covered in one band	400 MHz to 1000 MHz covered in two bands Band 1: 400 to 700 MHz Band 2: 700 to 1000 MHz
Frequency calibration accuracy	Within ± 2.5%	Within ± 2%			Within ± 1%
Input impedance	50 Ohms (nominal)				
Intermediate frequency	225 kHz	455 kHz (Bands 1 & 3) 1600 kHz (Bands 2, 4, 5 & 6)	10.7 MHz	30 MHz	42 MHz
Narrow band (CW) sensitivity, CARRIER detector function	See table 1-9				
Broadband (impulse) sensitivity, PEAK detector function	See table 1-10				
I-f bandwidth	See table 1-11				
Image and i-f rejection	Better than 80 dB (image) Better than 70 dB (i-f)	Better than 48 dB	Better than 30 dB	Better than 35 dB	Better than 42 dB
Spurious response rejection	Better than 70 dB	Better than 50 dB	Better than 60 dB		

(Cont'd)

TABLE 1-8. MODELS NF-105 AND NF-105/M-126 SPECIFICATIONS (Cont'd)

Parameter	Specification				
	T-X/NF-105 and T-X/NF-105/M-126 Tuning Units	T-A/NF-105 and T-A/NF-105/M-126 Tuning Units	T-1/NF-105 and T-1/NF-105/M-126 Tuning Units	T-2/NF-105 and T-2/NF-105/M-126 Tuning Units	T-3/NF-105 and T-3/NF-105/M-126 Tuning Units
Full-scale measurement range	0.1 microvolt to 0.1 volt in 20 dB steps	1 microvolt to 0.1 microvolt in 20 dB steps	10 microvolts to 0.1 volt in 20 dB steps		
Measurement range	146 dB (100 dB attenuation plus 20 dB i-f gain plus 26 dB meter scale) less internal noise level	126 dB (80 dB attenuation plus 20 dB i-f gain plus 26 dB meter scale) less internal noise level	106 dB (80 dB attenuation plus 26 dB meter scale) less internal noise level		
Scale tracking accuracy	± 1 dB @ 14 DB ± 1.5 dB @ 10 DB ± 2 dB @ 0 DB	± 1.5 dB @ 14 DB ± 2 dB @ 10 DB ± 2 dB @ 0 DB			± 1.5 dB @ 14 DB ± 2 dB @ 10 DB ± 3 dB @ 0 DB
Overload capability	20 dB beyond full scale deflection				
Impulse calibrator	Broadband impulse noise generator with output available for external use				
Impulse calibrator spectral intensity	Peak amplitude adjustable in 1-dB increments from 40 to 110 dB above 1 microvolt/MHz: flat to 450 kHz	Peak amplitude continuously adjustable from 30 to 97 dB above 1 microvolt MHz; flat to 1000 MHz			
Impulse repetition rate	Fixed at 100 pps	Continuously adjustable from 2.5 to 2,500 pps			
Pre and post i-f outputs	50-ohm output for spectrum signature analysis				
Recorder output	1 milliampere into 1500 ohms at full-scale deflection (100 microamperes into 1800 ohms available upon request)				
Video output	3 volts rms (full-scale deflection @ 80% modulation) into 3000 ohm load				
Audio output	100 milliwatts (nominal) into 600 ohms				
Analog x output	0 to +10 volts d-c as a function of frequency				

(Cont'd)

TABLE 1-8. MODELS NF-105 AND NF-105/M-126 SPECIFICATIONS (Cont'd)

Parameter	Specification				
	T-X/NF-105 and T-X/NF-105/M-126 Tuning Units	T-A/NF-105 and T-A/NF-105/M-126 Tuning Units	T-1/NF-105 and T-1/NF-105/M-126 Tuning Units	T-2/NF-105 and T-2/NF-105/M-126 Tuning Units	T-3/NF-105 and T-3/NF-105/M-126 Tuning Units
Operating temperature range	0° to +55°C				
Power requirements	115 volts (±10%), 50 to 400 Hz, 100VA; 12 or 24 vdc (with optional inverter)				
Dimensions	9 1/2" high x 18 3/4" wide x 14 5/8" deep				
Weight	Approximately 70 pounds (including any tuning unit)				

TABLE 1-9. MINIMUM NARROW BAND (CW) SENSITIVITY - CARRIER DETECTOR FUNCTION

Tuning Unit	Basis for Sensitivity Measurement	Conducted Two-Terminal 50 Ω Input			Radiated - 41 Inch Rod Antenna				Radiated-9Foot Rod Antenna		Radiated - Loop Antenna	
					Field Strength		Antenna Induced		Open Circuit		Field Strength	
		μV	dB μV	dBm	μV/m	dBμV/m	μV	dBμV	μV	dBμV	μV/m	dBμV/m
T-X/NF-105 and T-X/NF-105/M-126	S+N=2N @14 kHz	0.2	-14	-121	158	44	80	38	31.7	30	158	44
	S+N=2N @150 kHz				80	38	40	32	21.5	27	44.5	33
	MDS* @14 kHz	0.063	-24	-131	50	34	25.3	28	10	20	50	34
	MDS* @150 kHz				25.3	28	12.6	22	7.1	17	14	23
T-A/NF-105	S+N=2N @150 kHz	0.5	-6	-113	89	39	44.5	33	21.5	27	560	55
	S+N=2N @30 MHz				80	38	40	32	20	26	40	32
	MDS* @150 kHz	0.16	-16	-123	28.2	29	14	23	7.1	17	168	45
	MDS* @30 MHz				25.3	28	12.6	22	6.3	16	12.6	22
T-A/NF-105/M-126	S+N=2N @150 kHz	0.25	-12	-119	142	43	22.5	27	11.2	21	282	49
	S+N=2N @30 MHz				40	32	20	26	10	20	20	26
	MDS* @150 kHz	0.08	-22	-129	45	33	7.1	17	3.6	11	89	39
	MDS* @30 MHz				12.6	22	6.3	16	3.2	10	6.3	16

* Based on a cw signal level required for a 0.5 dB rise of meter indication above noise.
Maximum variation of sensitivity across band is equal to or less than 10 dB.

(Cont'd)

TABLE 1-9. MINIMUM NARROW BAND (CW) SENSITIVITY - CARRIER DETECTOR FUNCTION (Cont'd)

Tuning Unit	Basis for Sensitivity Measurement	Conducted Two-Terminal 50Ω Input			Radiated - Tuned Dipole Antenna			
					Field Strength		Antenna Induced	
		μV	dBμV	dBm	μV/m	dBμV/m	μV	dBμV
T-1/NF-105	S+N=2N @20 MHz	3.5	10.8	-96.2	2.92	9.3	9.2	19.8
	S+N=2N @200 MHz				22	26.8	11	20.8
	MDS* @20 MHz	1.11	0.8	-106.2	0.92	-0.7	2.9	9.8
	MDS* @200 MHz				6.95	16.8	3.5	10.8
T-1/NF-105/M-126	S+N=2N @20 MHz	0.46	-7.2	-114.2	0.58	-8.7	1.16	1.3
	S+N=2N @200 MHz				2.75	8.8	1.38	2.8
	MDS* @20 MHz	0.15	-17.2	-124.2	0.18	-18.7	3.67	-8.7
	MDS* @200 MHz				0.87	-1.2	4.37	-7.2
T-2/NF-105	S+N=2N @200 MHz	5.0	14	-93	29	29.6	15.2	23.6
	S+N=2N @400 MHz				22.2	26.9	17.6	24.9
	MDS* @200 MHz	1.6	4	-103	9.2	19.6	4.8	13.6
	MDS* @400 MHz				7	16.9	5.5	14.9
T-2/NF-105/M-126	S+N=2N @200 MHz	0.39	-8.1	-115.1	2.4	7.6	1.2	1.6
	S+N=2N @400 MHz				1.8	4.9	1.4	2.9
	MDS* @200 MHz	0.12	-18.1	-125.1	0.76	-2.1	0.38	-8.4
	MDS* @400 MHz				0.56	-5.1	0.45	-7.1

* Based on a cw signal level required for a 0.5 dB rise of meter indication above noise.

Maximum variation of sensitivity across band is equal to or less than 10 dB.

(Cont'd)

TABLE 1-9. MINIMUM NARROW BAND (CW) SENSITIVITY - CARRIER DETECTOR FUNCTION (Cont'd)

Tuning Unit	Basis for Sensitivity Measurement	Conducted Two-Terminal 50 Ω Input			Radiated - Tuned Dipole Antenna			
					Field Strength		Antenna Induced	
		μV	dB μV	dBm	μV/M	dB μV/m	μV	dB μV
T-3/NF-105	S+N=2N @400 MHz	6.5	16.2	-90.8	91	39.2	65	37.2
	S+N=2N @1000 MHz				290	49.2	29	29.2
	MDS* @400 MHz	2.06	6.2	-100.8	28.7	29.2	20.5	26.2
	MDS* @1000 MHz				91.5	39.2	9.2	19.2
T-3/NF-105/M-126	S+N=2N @400 MHz	0.54	-4.8	-111.8	25.7	28.2	20.5	26.2
	S+N=2N @1000 MHz				81	38.2	8.1	18.2
	MDS* @400 MHz	0.17	-14.8	-121.8	8.1	18.2	6.5	16.2
	MDS* @1000 MHz				25.5	28.2	2.6	8.2

* Based on a cw signal level required for a 0.5 dB rise of meter indication above noise.

Maximum variation of sensitivity across band is equal to or less than 10 dB.

TABLE 1-10. MINIMUM BROAD BAND (IMPULSE) SENSITIVITY - PEAK DETECTOR FUNCTION

Tuning Unit	Basis for Sensitivity Measurement	Conducted Two-Terminal 50 Ω Input		Radiated - 41 Inch Rod Antenna				Radiated - 9 Foot Rod Antenna		Radiated - Loop Antenna	
				Field Strength		Antenna Induced		Open Circuit		Field Strength	
		μV/kHz	dB μV/MHz	V/m/kHz	dB μV/m/MHz	μV/kHz	dB μV/MHz	μV/kHz	dB μV/MHz	μV/m/kHz	dB μV/m/MHz
T-X/NF-105 and T-X/NF-105/M-126	MDS* @14kHz	0.056	35	44.7	93	22.5	87	8.9	79	44.7	93
	MDS* @150kHz			22.5	87	11.2	81	6.3	76	12.8	82
T-A/NF-105	MDS* @150kHz	0.045	33	8	78	4	72	2	66	50	94
	MDS* @30MHz			6.3	76	3.2	70	1.6	64	3.5	71
T-A/NF-105/M-126	MDS* @150kHz	0.023	27	4	72	2	66	1	60	25	88
	MDS* @30MHz			3.2	70	1.6	64	0.8	58	1.8	65

				Radiated - Tuned Dipole Antenna			
				Field Strength		Antenna Induced	
				μV/m/kHz	dB μV/m/MHz	μV/kHz	dB μV/MHz
T-1/NF-105	MDS* @20MHz	0.04	32	0.032	30	0.1	40
	MDS* @200MHz			0.25	48	0.125	42
T-2/NF-105	MDS* @200MHz	0.032	30	0.2	46	0.1	40
	MDS* @400MHz			0.45	53	0.12	41
T-3/NF-105	MDS* @400MHz	0.032	30	0.45	53	0.16	44
	MDS* @1000MHz			1.4	63	0.14	43

*Based on an impulse signal level required for a 1 dB rise of meter indication above noise.

Maximum variation of sensitivity across band is equal to or less than 10 dB.

TABLE 1-11. I-F BANDWIDTHS

Tuning Unit	Nominal I-f Bandwidth
T-X/NF-105 and T-X/NF-105/M-126	1 kHz
T-A/NF-105 and T-A/NF-105/M-126	10 kHz
T-1/NF-105	125 kHz
T-1/NF-105/M-126	3 kHz
T-2/NF-105	225 kHz
T-2/NF-105/M-126	3 kHz
T-3/NF-105	400 kHz
T-3/NF-105/M-126	6 kHz

TABLE 1-12. ELECTRON TUBE AND CRYSTAL DIODE COMPLEMENT

Reference Symbol Number	Electron Tube or Crystal Diode Type	Function
Models BA-105 and BA-105/M-126 Basic Measuring Units		
CR2	1N34	Meter overload protection diode
CR4	1N251	Video detector
V18	6AL5	Meter detector
V19	12AT7	A- Audio detector; B- Video cathode follower
V20	12AU7	Audio amplifier
V21	6DJ8	Pulse stretcher and vtvm
V23	12AU7A	Repetition rate generator
V24	12AU7A	10 second multivibrator
V25	12AU7A	Cathode follower
V26 and V27	6X4	Full-wave rectifiers
V28	6X4	Half-wave rectifier
V29 and V30	6X4	Full-wave rectifiers
V31	0A2	Voltage regulator
Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units		
CR901 and CR902	CGD-146	Balanced mixer
V900	NE-2	Sawtooth generator
V901	6BA6	R-f amplifier

(Cont'd)

TABLE 1-12. ELECTRON TUBE AND CRYSTAL DIODE COMPLEMENT (Cont'd)

Reference Symbol Number	Electron Tube or Crystal Diode Type	Function
Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units (cont'd)		
V902	6C4	Local oscillator
V903	6CB6A	I-f amplifier
V904, V905 and V906	6BJ6	I-f amplifiers
V907	6BJ6	Trigger amplifier
V908	2D21	Delay line pulse generator
V909	6C4	Beat frequency oscillator
Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units		
V700	5702	R-f amplifier
V701	5784	Mixer
V702	5702	Local oscillator
V703 through V710	6BJ6	I-f amplifiers
V711	7586	Cathode follower
Models T-1/NF-105 and T-1/NF-105/M-126 Tuning Units		
CR1*	1N3005	Voltage regulator
V8 and V9	6AK5	R-f amplifiers
V10	12AT7	A- Mixer; B- Local oscillator
V11 and V12	6AK5	R-f amplifiers
V13	6U8	A- Mixer; B- Local oscillator
V14	6AK5	I-f amplifier
V15 and V16	6BJ6	I-f amplifiers
V17	6BJ6	I-f driver amplifier
V40*	6AK5	I-f amplifier
Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units		
CR1	1N21C	Mixer
CR2*	1N3005	Voltage regulator
V1	5876	R-f amplifier

(Cont'd)

*Employed only in M-126 versions of tuning unit

TABLE 1-12. ELECTRON TUBE AND CRYSTAL DIODE COMPLEMENT (Cont'd)

Reference Symbol Number	Electron Tube or Crystal Diode Type	Function
Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units (cont'd)		
V2	6F4	Local oscillator
V3*	6BQ7	I-f amplifier
V3	6BJ6	I-f amplifier
V4 through V6	6BJ6	I-f amplifiers
V7	6BJ6	I-f driver amplifier
V900*	6AK5	I-f amplifier
Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units		
CR3*	1N3005	Voltage regulator
CR601 and CR602	1N21C	Mixers
V601	5876	R-f amplifier
V602	6F4	Local oscillator
V603	5876	R-f amplifier
V604	6T4	Local oscillator
V605	6BQ7	I-f amplifier
V606, V607 and V608	6AK5	I-f amplifiers
V609	6BJ6	I-f amplifier
V610	6BJ6	I-f driver amplifier
V611*	6AK5	I-f amplifier

*Employed only in M-126 versions of tuning unit

TABLE 1-13. FUSE AND INDICATOR LAMP COMPLEMENT

Reference Symbol Number	Type	Function
FUSES		
F1 (BA-105 & BA-105/M-126)	1.6 ampere	Protective fuse
INDICATOR LAMPS		
DS1 (BA-105 & BA-105/M-126)	47	POWER pilot lamp
DS900 through DS902 (T-X/NF-105 & T-X/NF-105/M-126)	47	Band illumination lamps

(Cont'd)

TABLE 1-13. FUSE AND INDICATOR LAMP COMPLEMENT (Cont'd)

Reference Symbol Number	Type	Function
INDICATOR LAMPS (cont'd)		
DS700 and DS701 (T-A/NF-105 & T-A/NF-105/M-126)	47	Band illumination lamps
DS1 and DS2 (T-1/NF-105 & T-1/NF-105/M-126)	47	Band illumination lamps
DS1 (T-2/NF-105 & T-2/NF-105/M-126	47	Band illumination lamps
DS601 and DS602 (T-3/NF-105 & T-3/NF-105/M-126)	47	Band illumination lamps

SECTION II
OPERATION

2-1. GENERAL.

2-2. This section contains instructions for the installation and operation of the Models NF-105 and NF-105/M-126. It is recommended that the operator become thoroughly familiar with the material in this section before attempting to operate the equipment. Failure to do so may compromise the versatility and accuracy that has been engineered into the equipment.

2-3. INSTALLATION.

2-4. UNPACKING. The unpacking and handling of the Model NF-105 and/or NF-105/M-126 requires that the normal precautions applicable to the handling of sensitive electronic equipment be observed. Check the contents of all shipping containers against the packing invoice to ensure that the equipment is complete as ordered.

2-5. EXTERNAL INSPECTION. After the equipment has been removed from its shipping container, undo the four latches that secure the dust cover to the cabinet. Remove the dust cover and visually inspect the equipment for indications of damage which may have occurred during shipment. Check all front panel controls for freedom of movement, full travel and positive-detent locking. Note any evidence (such as broken glass, dents, etc.) indicating that the equipment has sustained a severe shock. Check the condition of all accessories supplied with the equipment (refer to paragraph 1-13).

2-6. INTERNAL INSPECTION. If the equipment was received with a tuning unit installed in the basic unit, rotate the tuning unit latch locking screw counterclockwise and lift the spring-loaded latch up to clear the front panel of the tuning unit. With the latch held in this position, grasp the tuning unit handle and carefully pull the tuning unit forward until the front panel clears the latch. Release the latch and, while bracing the basic unit to prevent movement, pull the tuning unit forward to completely remove it from its compartment in the basic unit.

2-7. Remove the seven screws (and associated lockwashers) that secure the tuning unit dust cover to the tuning unit frame and remove the dust cover. Check that all connectors are properly mated to their receptacles and that all tubes are firmly seated in their sockets and their shields are in place. Replace the tuning unit into its dust cover and secure the two with the hardware removed at the beginning of this paragraph.

2-8. With no tuning unit installed in the basic unit, lift the rear of the equipment so that the basic unit rests on its front panel. Remove the 13 screws that secures the cabinet to the equipment frame and carefully lift the cabinet from the frame. Check that all connectors are properly mated to their receptacles and that all tubes are firmly seated in their sockets and their shields (where applicable) are in place. Replace the cabinet over the equipment and secure the two with the screws removed at the beginning of the paragraph. Carefully set the equipment in its normal position.

2-9. Insert the desired tuning unit into the basic unit by following the procedure of paragraph 2-6 in reverse order.

2-10. MOUNTING. The equipment should be mounted on a sturdy surface that is free from vibration. The equipment is provided with a removable rubber-gasketed front panel dust cover designed to protect the equipment from dust, dirt and moisture during storage, transit and other non-operating periods. This protective dust cover should be secured over the equipment front panel whenever the Model NF-105 and/or NF-105/M-126 is not in use.

2-11. OUTLINE DRAWING. The outline dimension drawing of the basic unit is shown in figure 2-1. All dimensions are in inches.

2-12. OPERATION.

2-13. The procedures for proper operation of the equipment are contained in paragraphs 2-14 through 2-37.

2-14. OPERATING CONTROLS, INDICATORS AND CONNECTORS. All controls, indicators and connectors necessary for operation of the equipment are located on the basic unit and tuning unit front panels, as illustrated in figure 2-2; their functions are described in table 2-1.

2-15. POWER APPLICATION AND PRELIMINARY ADJUSTMENTS. To prepare the equipment for operation, follow the procedures detailed in paragraphs 2-16 through 2-19.

2-16. Initial Control Settings. Set the controls as listed in table 2-2 prior to application of line power. Controls not specifically referenced in the table may be set to any arbitrary position.

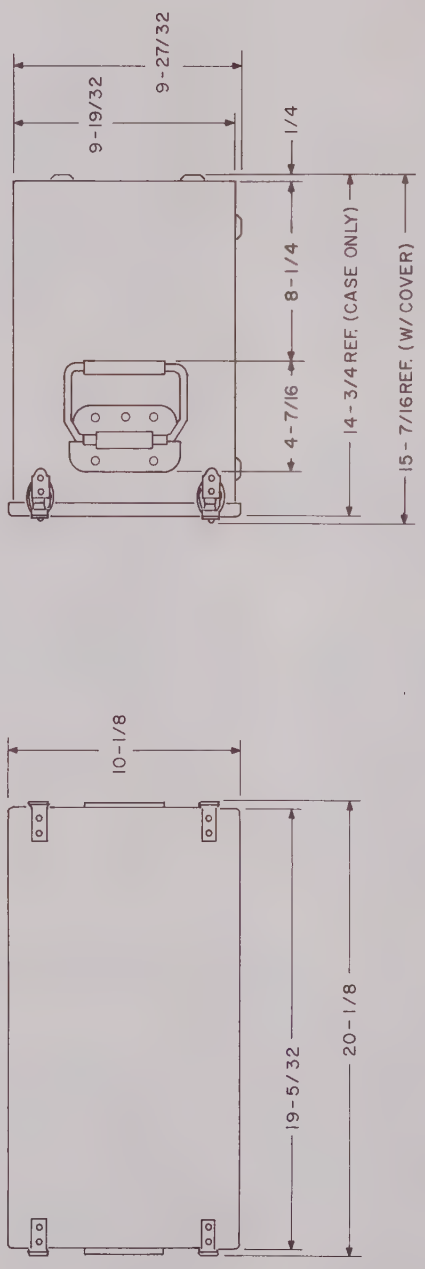


Figure 2-1. Outline Dimension Drawing

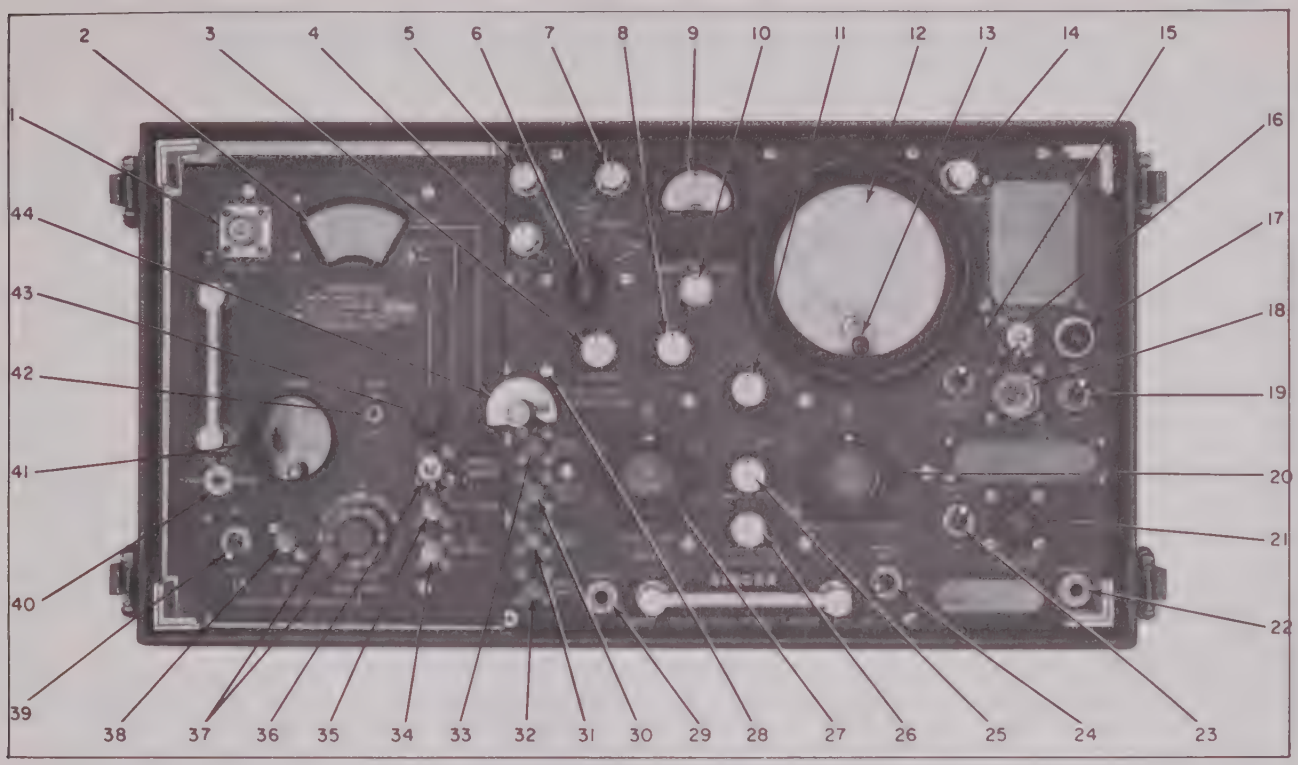


Figure 2-2. Operating Controls, Indicators and Connectors

TABLE 2-1. OPERATING CONTROLS, INDICATORS AND CONNECTORS

Control, Indicator or Connector	Figure 2-2 Index No.	Function
VERT. ANT. jack*	1	UHF connector which serves as both a mount and a receptacle for the Model VX-105 41-Inch Vertical Antenna.
KHZ (or MHZ) dial	2	Indicates the frequency to which the equipment is tuned
SLIDEBACK control	3	Enables operator to adjust the back-bias voltage applied to the audio detector when measuring the peak value of signals by the slideback technique (in conjunction with the VOLUME control and a 600-ohm headset plugged into the PHONES receptacle).
METER BAL. control	4	Permits the operator to balance the vtvm during preliminary adjustment procedures (in conjunction with the Function Selector switch).
ZERO ADJ. control	5	Permits the operator to adjust the output meter for a pointer indication of 0 during preliminary adjustment procedures (in conjunction with the Function Selector switch).

* Peculiar to Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units only.

(Cont'd)

TABLE 2-1. OPERATING CONTROLS, INDICATORS AND CONNECTORS (Cont'd)

Control, Indicator or Connector	Figure 2-2 Index No.	Function
Function Selector switch	6	Selects operating mode of the equipment, as follows: METER BAL. position - Permits the operator to balance the vtvm during preliminary adjustment procedures (in conjunction with the METER BAL. control); ZERO ADJ. position - Permits the operator to obtain an output meter pointer indication of 0 during preliminary adjustment procedures (in conjunction with the ZERO ADJ. control); CARRIER ZERO position - Permits the operator to obtain an output meter pointer indication of 0 during preliminary adjustment procedures (in conjunction with the CARRIER ZERO control); CARRIER position - Permits the operator to evaluate the magnitude of narrow band (cw or modulated cw) signals; PEAK position - Permits the operator to evaluate the magnitude of broad band (pulsed) signals.
CARRIER ZERO control	7	Permits the operator to adjust the output meter for a pointer indication of 0 during preliminary adjustment procedures (in conjunction with the Function Selector switch).
IF GAIN control	8	Enables the operator to adjust the overall gain of the equipment.
ADD TO IMPULSE GEN. OUTPUT control	9	Permits continuous adjustment of the impulse generator output level (for a given setting of the IMPULSE GEN. OUTPUT DBMHZ) over a 17 dB range.
ADD TO IMPULSE GEN. OUTPUT meter	10	Indicates that value which must be added to the setting of the IMPULSE GEN. OUTPUT DBMHZ switch to obtain the impulse generator output level in dB above 1 microvolt per megahertz (dB μV/MHz).
IMPULSE GEN. P.R.R. HZ control	11	Permits continuous adjustment (in conjunction with the IMPULSE GEN. P.R.R. HZ multiplier switch) of the impulse generator pulse repetition rate from 2.5 to 2,500 pulses per second.
Output meter	12	Provides calibrated dB and microvolt scales which, in conjunction with the settings of the SIGNAL INPUT ATTENUATOR DB switch, SUBTRACT 10 DB switch and the tuning unit SIG. ATT. switch (T-X/NF-105 and T-X/NF-105/M-126 Tuning Units only), permits the operator to evaluate the magnitude of the signal under measurement.
Output meter zero set screwdriver control	13	Permits mechanical zero setting of output meter pointer.

(Cont'd)

TABLE 2-1. OPERATING CONTROLS, INDICATORS AND CONNECTORS (Cont'd)

Control, Indicator or Connector	Figure 2-2 Index No.	Function
VOLUME control	14	Permits the operator to adjust the level of the audio signal coupled to a 600-ohm headset plugged into the PHONES receptacle.
SUBTRACT 10 DB switch	15	Permits the operator to increase the sensitivity of the output meter by 10 dB, effectively providing a 10-dB overlap of meter scales (except for the 0 position of the SIGNAL INPUT ATTENUATOR DB switch).
SUBTRACT 10 DB/105/M-126 switch **	Not Shown	Permits the basic unit to operate with either a standard tuning unit (when set to either 105 or SUBTRACT 10 DB) or an M-126 tuning unit (when set to M-126).
IF OUT jack	16	Front panel connector at which the output of the i-f amplifier is available for application to an EMPIRE Model PA-210 Spectrum Signature Pandaptor.
POWER pilot light	17	Illuminates when operating power is coupled to the equipment.
POWER receptacle	18	Connector through which ac line power is applied to the equipment.
POWER switch	19	Couples applied ac line power to the equipment.
SIGNAL INPUT ATTENUATOR DB switch	20	Permits the operator to extend the meter range by 80 dB in 20-dB increments.
EXT. METER RECORDER receptacle	21	Connector through which the meter signal and audio signals are coupled to a Model RE-105-AX Remote Indicator or through which the meter signal and analog X-output voltage are coupled to an X-Y recorder.
GROUND receptacle	22	Connector provided for coupling equipment chassis ground to external ground via the Model GR-105 Grounding Strap.
METER switch	23	When set to EXT., the meter signal is coupled to the EXT. METER RECORDER receptacle for application to a 1500-ohm external meter.
IMPULSE GEN. switch	24	Momentary action switch which energizes the basic unit impulse generator when the switch is held in the ON position.
IMPULSE GEN. P.R.R. HZ switch	25	Multiplier which, in conjunction with the IMPULSE GEN. P.R.R. HZ control, permits continuous adjustment of the basic unit impulse generator repetition rate from 2.5 to 2,500 pulses per second.
IMPULSE GEN. FINE CONTACT ADJ. control	26	Permits adjustment of the basic unit impulse generator driving voltage for optimum operation.

** Peculiar to Model BA-105/M-126 Basic Measuring Unit only.

(Cont'd)

TABLE 2-1. OPERATING CONTROLS, INDICATORS AND CONNECTORS (Cont'd)

Control, Indicator or Connector	Figure 2-2 Index No.	Function
IMPULSE GEN. OUTPUT DBMHZ switch	27	Step attenuator which, in conjunction with the ADD TO IMPULSE GEN. OUTPUT control and meter, permits the operator to continuously adjust the basic unit impulse generator output level from 30 to 97 dB above 1 microvolt per megahertz (30 to 97 dBμV/MHz).
IMPULSE GEN. CONTACT PRE-ADJ. screwdriver control	28	Permits adjustment of spacing between contacts within the basic unit impulse generator for optimum operation.
PHONES receptacle	29	Connector at which the audio modulation content of the applied signal is available for application to a 600-ohm headset.
IMPULSE GEN. jack	30	Connector at which the output of the basic unit impulse generator is available for application to either the tuning unit or to auxiliary test equipment.
VIDEO OUTPUT jack	31	Connector at which the detected i-f signal is available for application to an oscilloscope for viewing the modulation content of the signal under measurement.
SIGNAL INPUT jack	32	Connector which accepts the signal under measurement.
ATTEN. OUTPUT jack	33	Connector at which the attenuated signal under measurement is available for application to the tuning unit TO ATTENUATOR jack.
TO SIG. INPUT jack*	34	Connector at which the impedance matched output of the Model VX-105 41-Inch Vertical Antenna is available for application to the basic unit SIGNAL INPUT jack.
TO ATTENUATOR jack	35	Connector which accepts the attenuated r-f signal from the basic unit ATTEN. OUTPUT jack for application to the r-f tuner.
PRE-IF OUTPUT jack	36	Connector at which the output of the mixer is available for application to an EMPIRE Model PA-210 Spectrum Signature Panadaptor.
IMPULSE GEN. LEVEL (DBMHZ) switches*	37	Permits the operator to adjust the tuning unit impulse generator output level, in 1-dB increments, from 40 to 110 dB above 1 microvolt per megahertz (40 to 110 dBμV/MHz).
IMPULSE GEN. OUTPUT jack*	38	Connector at which the tuning unit impulse generator output is available for application to either the basic unit SIGNAL INPUT jack or auxiliary test equipment.
IMPULSE GEN. switch*	39	Energizes the tuning unit impulse generator when set to ON.

* Peculiar to Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units only.

(Cont'd)

TABLE 2-1. OPERATOR CONTROLS, INDICATORS AND CONNECTORS (Cont'd)

Control, Indicator or Connector	Figure 2-2 Index No.	Function
SIG. ATT. switch*	40	Permits insertion or removal of 20-dB pad in the r-f signal path.
TUNING control	41	Permits the operator to tune to any signal within the band of the tuning unit.
BFO switch*	42	Energizes an internal beat frequency oscillator which, in conjunction with the VOLUME control and a 600-ohm headset plugged into the PHONES receptacle, facilities fine tuning to the applied signal.
BAND SELECTOR switch	43	Permits the operator to select the tuning unit band compatible with the frequency of the signal to be measured.
FINE TUNING control***	Not Shown	Permits fine adjustment of the local oscillator frequency for optimum tuning to the signal frequency.

* Peculiar to Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units only.
*** Peculiar to Models T-1/NF-105/M-126, T-2/NF-105/M-126 and T-3/NF-105/M-126 Tuning Units only.

TABLE 2-2. INITIAL CONTROL SETTINGS

Control	Setting
POWER switch	OFF
METER switch	INT.
SIGNAL INPUT ATTENUATOR DB switch	20
IMPULSE GEN. switch	OFF
IMPULSE GEN. OUTPUT DBMHZ switch	70
ADD TO IMPULSE GEN. OUTPUT control	Mid-position
IF GAIN control	Mid-position
VOLUME control	Mid-position
IMPULSE GEN. P.R.R. HZ switch	X100
IMPULSE GEN. P.R.R. HZ control	25
Function Selector switch	METER BAL.
FINE TUNING control*	Mid-position
SUBTRACT 10DB 105/M-126 switch*	M-126
BFO switch**	OFF

* Only when Model BA-105/M-126 Basic Measuring Unit is employed in conjunction with a T-1/NF-105/M-126, T-2/NF-105/M-126, or T-3/NF-105/M-126 Tuning Unit.
** Only when Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is employed.

(Cont'd)

TABLE 2-2. INITIAL CONTROL SETTINGS (Cont'd)

Control	Setting
IMPULSE GEN. switch**	OFF
IMPULSE GEN. LEVEL (DBMHZ) switches**	70 and 0
SIG. ATT. switch**	NORM.

** Only when Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is employed.

CAUTION

PULL OUT THE SIGNAL INPUT ATTENUATOR DB SWITCH AND/OR THE IMPULSE GEN. OUTPUT DBMHZ SWITCH BEFORE PLACING IN A NEW SETTING. TURNING THE SWITCH KNOB WITHOUT FIRST PULLING IT FORWARD WILL DAMAGE THE SWITCH. AFTER THE DOT ON THE SWITCH KNOB IS LINED UP FOR THE DESIRED SETTING, PUSH THE KNOB ALL THE WAY IN.

2-17. With the POWER switch set to OFF, check the indication of the output meter pointer; it should indicate 0 on the MICROVOLTS scale. If this indication is not obtained, carefully adjust the output meter mechanical zero set screwdriver control until the pointer deflects to a MICROVOLTS scale indication of 0.

2-18. Power Application. Interconnect the equipment as illustrated in figure 2-3. Set the POWER switch to ON and, if an inverter or autotransformer is employed, set its "power" switch to "on." (If an autotransformer is employed, adjust its output for 115 volts after energization.) The POWER pilot lamp will illuminate upon application of line power. Allow the equipment to warm up for at least 15 minutes before performing the preliminary adjustments.

2-19. Preliminary Adjustments. After the equipment has warmed up for at least 15 minutes, perform the preliminary adjustments described below.

a. With the Function Selector switch set to METER BAL., adjust the METER BAL. control, if necessary, to obtain an output meter pointer indication of 0 on the MICROVOLTS scale.

b. Set the Function Selector switch to ZERO ADJ. and adjust the ZERO ADJ. control, if necessary, to obtain an output meter pointer indication of 0 on the MICROVOLTS scale.

c. Set the Function Selector switch to CARRIER ZERO and adjust the CARRIER ZERO control, if necessary, to obtain an output meter pointer indication of 0 on the MICROVOLTS scale.

Note

Steps d and e do not apply when a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is installed in the basic unit.

d. Connect the 6-inch patch cable between the basic unit ATTENUATOR OUTPUT jack and the tuning unit TO ATTENUATOR jack.

e. Connect the 18-inch patch cable between the basic unit SIGNAL INPUT and IMPULSE GEN. jacks.

f. Plug the Model EA-105 Earphones into the PHONES receptacle.

g. Set the Function Selector switch to PEAK.

h. Momentarily depress the basic unit IMPULSE GEN. switch and listen for the aural indication of the impulse generator repetition rate. Adjust the IMPULSE GEN. FINE CONTACT ADJ. control, if necessary, to obtain the sharpest aural indication of the nominally 2.5-kHz impulse generator repetition rate. (If no aural indication can be obtained with adjustment of the IMPULSE GEN. FINE CONTACT ADJ. control, set this control to mid-position and adjust the IMPULSE GEN. CONTACT PRE-ADJ. screwdriver control to obtain an aural indication.) Release the basic unit IMPULSE GEN. switch after this adjustment has been performed.

i. Allow the equipment to warm up for an additional 90 minutes before making any measurements.

2-20. EQUIPMENT INTERCONNECTION. After the proper tuning unit has been installed in the basic unit and the preliminary adjustments have been performed, determine the type of measurement to be made. Connect the appropriate pickup device (see table 2-3) and auxiliary equipment to the basic unit and/or tuning unit as illustrated in the referenced interconnection figure. A basic interconnection diagram is illustrated in figure 2-4.

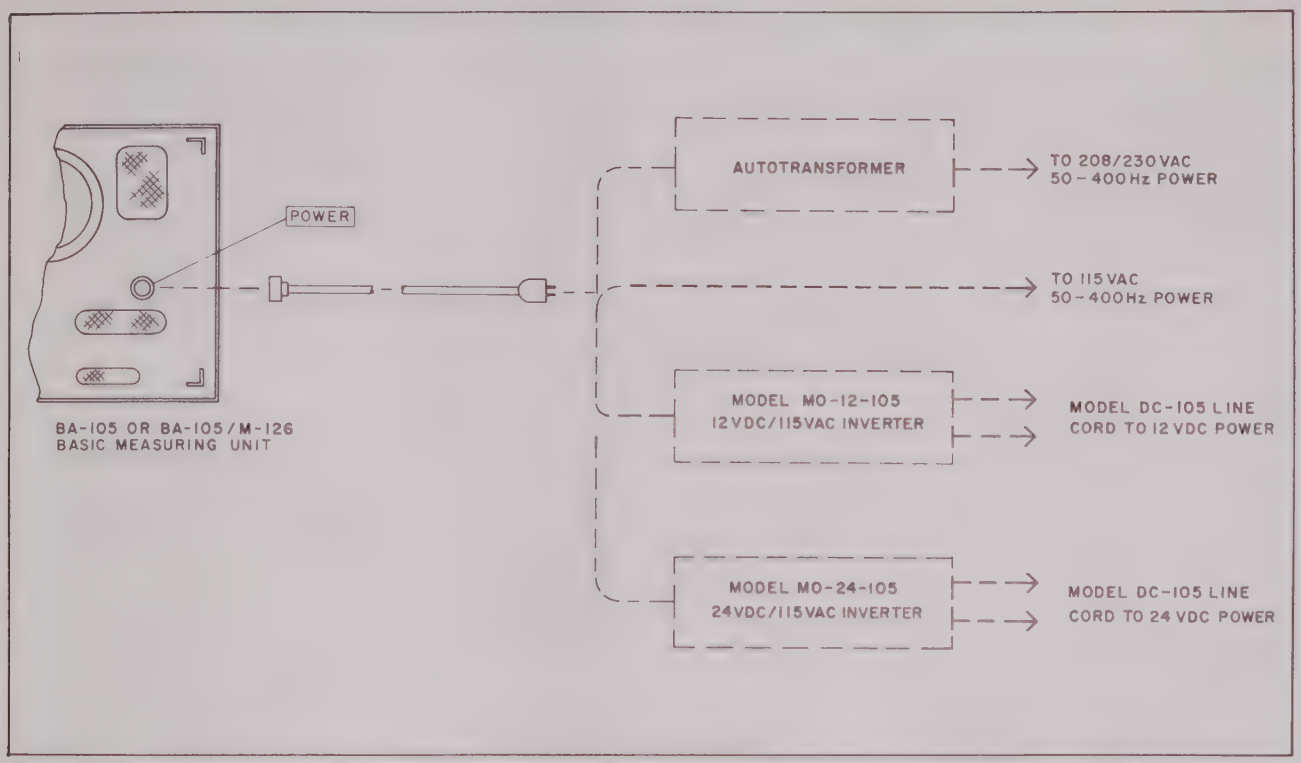


Figure 2-3. Power Connection Diagram

TABLE 2-3. PICKUP DEVICE SELECTION CHART

Measurement to Be Performed	Frequency Range	Pickup Device	Calibration Method	Reference Illustration
Intensity of narrow band or broad band conducted signals	14 to 150 kHz	Model CP-105 Clamp-on Probe or Model LB-105 50-Ohm Line Probe	Shunt	Figure 2-5
	150 kHz to 30 MHz	Model CP-105 Clamp-on Probe, Model LA-105 50-Ohm Line Probe or Model LF-105 500-Ohm Line Probe	Shunt	Figure 2-7
	20 to 200 MHz	Model CP-105 Clamp-on Probe (to 100 MHz), Model LL-105 50-Ohm Line Probe or Model LH-105 500-Ohm Line Probe	Shunt	Figure 2-8
	200 to 1000 MHz	Model LL-105 50-Ohm Line Probe or Model LH-105 500-Ohm Line Probe	Shunt	Figure 2-9 (200 to 400 MHz); Figure 2-10 (400 to 1000 MHz)

(Cont'd)

TABLE 2-3. PICKUP DEVICE SELECTION CHART (Cont'd)

Measurement to Be Performed	Frequency Range	Pickup Device	Calibration Method	Reference Illustration
Intensity of narrow band or broad band radiated signals	14 to 150 kHz	Model LG-105-A 36-Inch Loop Antenna, Model VR-1-105 41-Inch Telescoping Vertical Antenna or Model VX-105 41-Inch Telescoping Vertical Antenna	Shunt	Figure 2-5; Figure 2-6 (Model VX-105)
	150 kHz to 30 MHz	Model VA-105 41-Inch Telescoping Antenna, Model LP-3-105 36-Inch Loop Antenna or Model LP-105 12-Inch Loop Antenna	Shunt	Figure 2-7
		Model VA-105-SC 9-Foot Vertical Antenna	Series	Figure 2-11
	20 to 200 MHz	Model MD-105-T1 Broad Band Dipole Antenna or Model DM-105-T1 Dipole Antenna (20 to 140 MHz) and Model DM-105-T2 Dipole Antenna (140 to 200 MHz)	Shunt	Figure 2-8
		Model BB-105 Broad Band Discone Antenna	Series	Figure 2-12
	200 to 400 MHz	Model DM-105-T2 Dipole Antenna	Shunt	Figure 2-9
		Model BB-105 Broad Band Discone Antenna	Series	Figure 2-12
	400 to 1000 MHz	Model DM-105-T3 Dipole Antenna or Model RA-105 Corner Reflector Antenna	Shunt	Figure 2-10
		Model BB-105 Broad Band Discone Antenna	Series	Figure 2-12

2-21. SITE SELECTION. Site requirements are determined by the type of measurement to be made and the applicable measurement specification.

2-22. Indoor interference and field intensity measurements should be made in a shielded room so that stray signals not associated with the test sample will not affect the measurement accuracy. Personnel present should be limited to the number required for the actual measurement, and no one should be less than 3 feet from the sample or the pickup device.

2-23. Outdoor interference and field intensity measurements should be made on an open, level site, preferably at the top of a hill or over water. (It should be noted that reception over water is normally more noise-free than over land.) While atmospheric noise is inevitably present, other ambient noises should be eliminated or minimized as much as possible. The selected site should have a minimum of trees and underbrush and be at least 100 feet from any possible source of man-made interference (such as power lines, telephone lines, industrial buildings, etc.). Undesirable results can be expected if the measurements are conducted in the proximity of steel bridges, overpasses, underpasses, metal fences, steel-framed buildings or any other object displaying conductive or inductive properties.

2-24. If the measurement to be performed requires the use of a vertical antenna (other than the Model VX-105 41-Inch Vertical Antenna), loop antenna, dipole antenna or broadband discone antenna, the applicable antenna must be mounted on the Model TP-105-A Tripod either directly or in conjunction with the Model GP-105 Ground Plane. To set up the tripod, first remove it from its storage bag and then extend the legs to the desired elevation. Tighten the three locking knobs (one located on each tripod leg) to lock the legs in the selected elevation. Spread the extended legs so that the tripod will present a stable base for the selected antenna and tighten the three locking knobs (one located at the top of each tripod leg). If the antenna

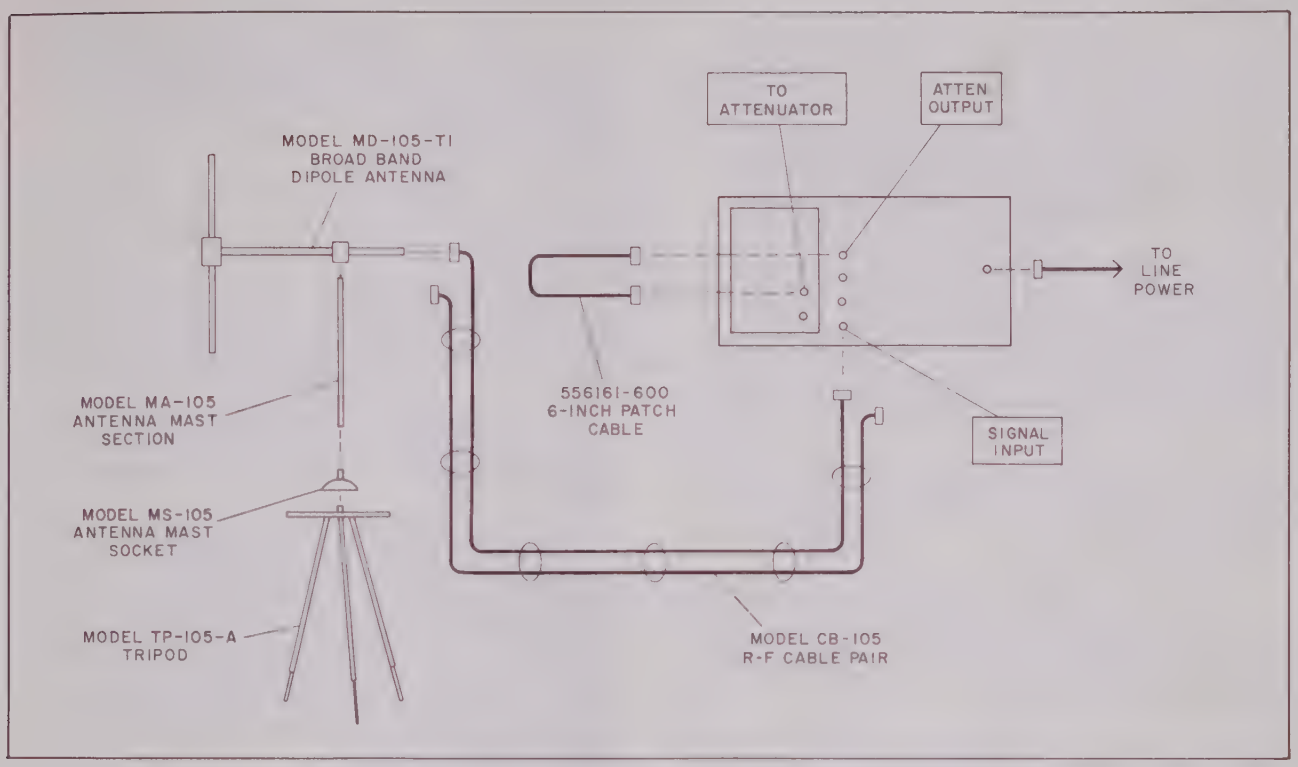


Figure 2-4. Basic Interconnection Diagram

mounts directly onto the tripod, secure the antenna by tightening the mounting bolt located under the tripod mounting plate. If the antenna mounts on the ground plane, secure the ground plane to the tripod mounting plate and then mount the antenna onto the ground plane.

WARNING

STRONG WIND GUSTS MAY TIP OVER THE LARGER ANTENNAS IF THEY ARE ELEVATED BY MEANS OF ONE OR MORE ANTENNA MAST SECTIONS, RESULTING IN DAMAGE TO THE EQUIPMENT AND POSSIBLE INJURY TO PERSONNEL.

2-25. When using a dipole antenna or the corner reflector antenna, mount the Model MS-105-A Antenna Mast Socket to the tripod, add the required number of Model MA-105 Antenna Mast Sections and then mount the antenna. Note that these antennas require the use of a clamp block. When searching for the presence of radiated signals, the selected dipole antenna (having telescoping dipole elements) may be tuned to the middle of the band. Once the presence of a signal has been established, the dipole antenna should be tuned to the signal frequency through the use of either the megahertz rule or megahertz tape.

2-26. The position of the pickup is usually determined by specification requirements. Note that the basic unit may be located up to 30 feet from the pickup device.

2-27. MEASUREMENT OF NARROW BAND CONDUCTED SIGNALS (R-F VOLTMETER). To measure the level of narrow band conducted signals, proceed as directed in the following steps. (This procedure assumes that the signal frequency is not known. If the signal frequency is known, perform steps a and b and then continue at step 1.)

a. Energize the equipment and perform the preliminary adjustments detailed in paragraphs 2-16 through 2-19.

CAUTION

DO NOT CONNECT LINE PROBES ACROSS POWER LINE LEADS HAVING A POTENTIAL DIFFERENCE EXCEEDING 500 VOLTS.

b. Set the Model SU-105 Switching Unit switch to CALIBRATE and couple the applicable pickup device (refer to table 2-3) to the signal or power line under test. (If a Model SU-105 Switching Unit is not available, perform steps c through e before coupling the selected pickup device to the SIGNAL INPUT jack.)

c. Set the SIGNAL INPUT ATTENUATOR DB switch to 0. (If a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is installed in the basic unit, set the tuning unit SIG. ATT. switch to -20DB. If a Model T-A/NF-105/M-126 through T-3/NF-105/M-126 Tuning Unit is installed in a Model BA-105/M-126 Basic Measuring Unit, set the basic unit M-126/105/SUBTRACT 10DB switch to M-126.)

d. Set the BAND SELECTOR switch to the lowest frequency band (the Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units do not have a BAND SELECTOR switch) and rotate the TUNING control counterclockwise to obtain a kHz or MHz dial indication corresponding to the low-frequency end of the selected band.

e. Set the Function Selector switch to CARRIER and adjust the IF GAIN control to obtain an output meter pointer noise indication of approximately 4 on the upper DB scale.

f. Set the Model SU-105 Switching Unit switch to READ. (If a Model SU-105 Switching Unit is not available, couple the selected pickup device to the SIGNAL INPUT jack via the Model CB-105 R-f Cable Pair.)

g. Slowly rotate the TUNING control clockwise to scan the band in search of the presence of a signal. Signal interception will cause the output meter pointer to rise upscale above noise as the signal enters the equipment bandpass.

Notes

1. For aural monitoring of applied signals, plug the Model EA-105 Earphones into the PHONES receptacle. If the applied signal is audio-modulated, the modulation content will be heard with maximum intensity when the signal is centered in the equipment bandpass.

2. When using the Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit, the reception of unmodulated signals can be facilitated by setting the tuning unit BFO switch to ON. A 500-Hz tone of maximum intensity will be heard when the signal is centered in the equipment passband.

3. The loudness of the aural indication can be adjusted to a comfortable level be means of the VOLUME control.

4. Set the BFO switch to OFF when measuring the level of the applied signal.

h. Continue rotating the TUNING control clockwise until a maximum output meter pointer deflection is obtained. Should the output meter pointer deflect to an off-scale indication before reaching a maximum:

(1) If a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is installed in the basic unit, first set the SIG. ATT. switch to NORM.

(2) If a Model T-A/NF-105/M-126 through T-3/NF-105/M-126 Tuning Unit is installed in a Model BA-105/M-126 Basic Measuring Unit, first set the M-126/105/SUBTRACT 10DB switch to 105.

(3) If a Model T-A/NF-105 through T-3/NF-105 Tuning Unit is installed in a basic unit, set the SIGNAL INPUT ATTENUATOR DB switch to 20.

i. Continue rotating the TUNING control clockwise (inserting attenuation as necessary by means of the SIGNAL INPUT ATTENUATOR DB switch) until a maximum output meter pointer deflection is obtained. Note the frequency at which this maximum occurs and the settings of all attenuator switches (SIGNAL INPUT ATTENUATOR switch, SIG. ATT. switch and/or M-126/105/SUBTRACT 10DB switch).

j. Continue rotating the TUNING control clockwise. If no other signal component is adjacent to that just intercepted, the output meter pointer will begin to drop downscale as the intercepted signal leaves the center of the equipment bandpass. Remove r-f attenuation (by means of the SIGNAL INPUT ATTENUATOR DB and SIG. ATT. switches), while simultaneously rotating the TUNING control clockwise, until the output meter pointer again indicates noise when in its most sensitive condition or the pointer once again rises upscale to indicate the interception of another signal component.

k. Repeat steps h through j until all signal component frequencies within the frequency range of the tuning unit have been noted.

l. Tune the equipment to the frequency of the intercepted signal and calibrate as a two-terminal vtvm as directed in the following steps.

(1) Set the Model SU-105 Switching Unit switch to CALIBRATE. (If a Model SU-105 Switching Unit is not available, couple the cable from either the IMPULSE GEN. or IMPULSE GEN. OUTPUT jack to the SIGNAL INPUT jack.)

(2) Set the Function Selector switch to PEAK.

(3) Set the SIGNAL INPUT ATTENUATOR switch, SIG. ATT. switch, IMPULSE GEN. OUTPUT DBMHZ switch, IMPULSE GEN. LEVEL (DBMHZ) switches and/or ADD TO IMPULSE GEN. OUTPUT control, as required, as indicated in the calibration chart for the particular tuning unit in use. (Table 2-4 lists the appropriate calibration chart to be employed in conjunction with each tuning unit.)

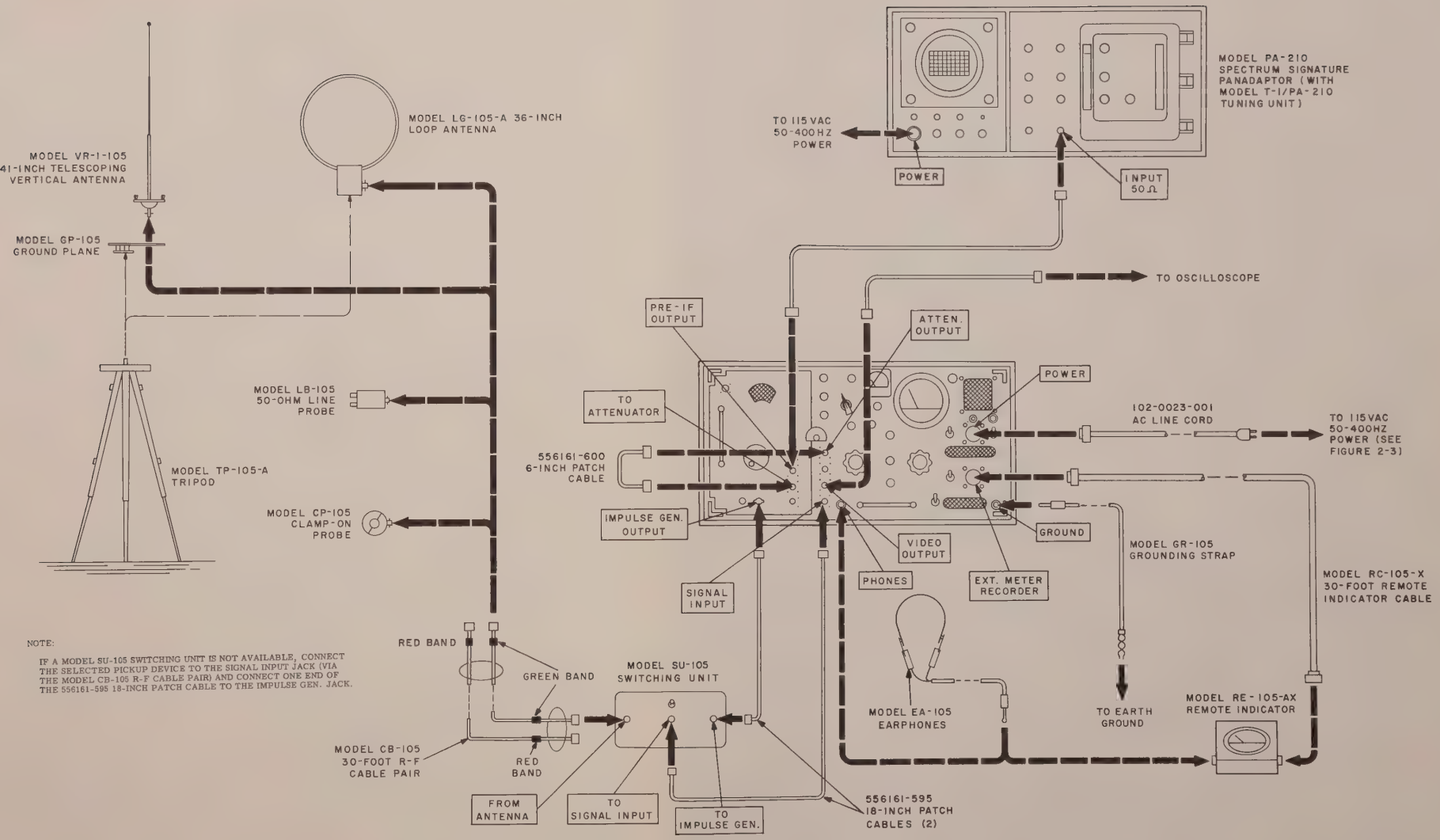


Figure 2-5. Typical Test Setups for Measurements from 14 to 150 kHz Employing Shunt Calibration Method

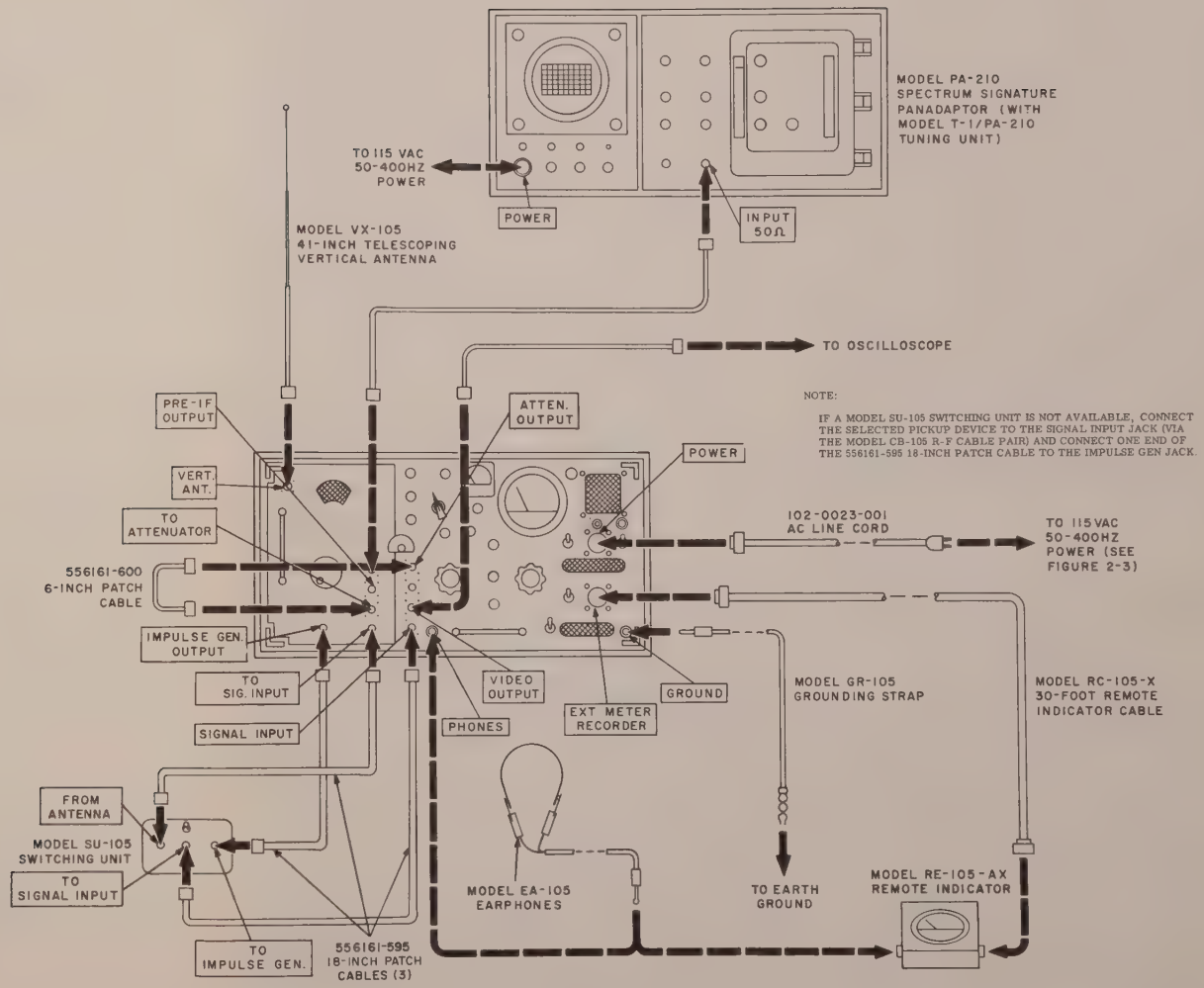
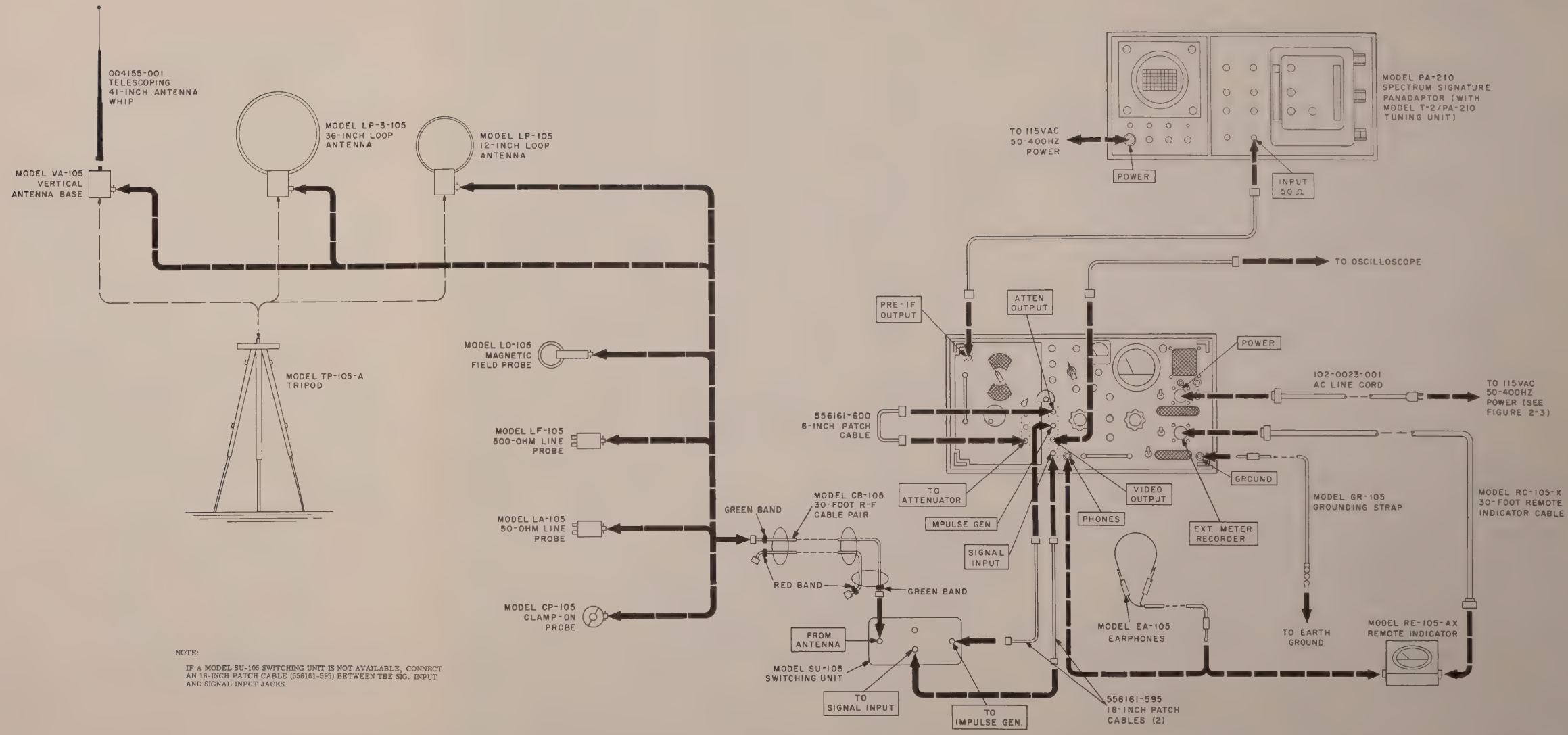


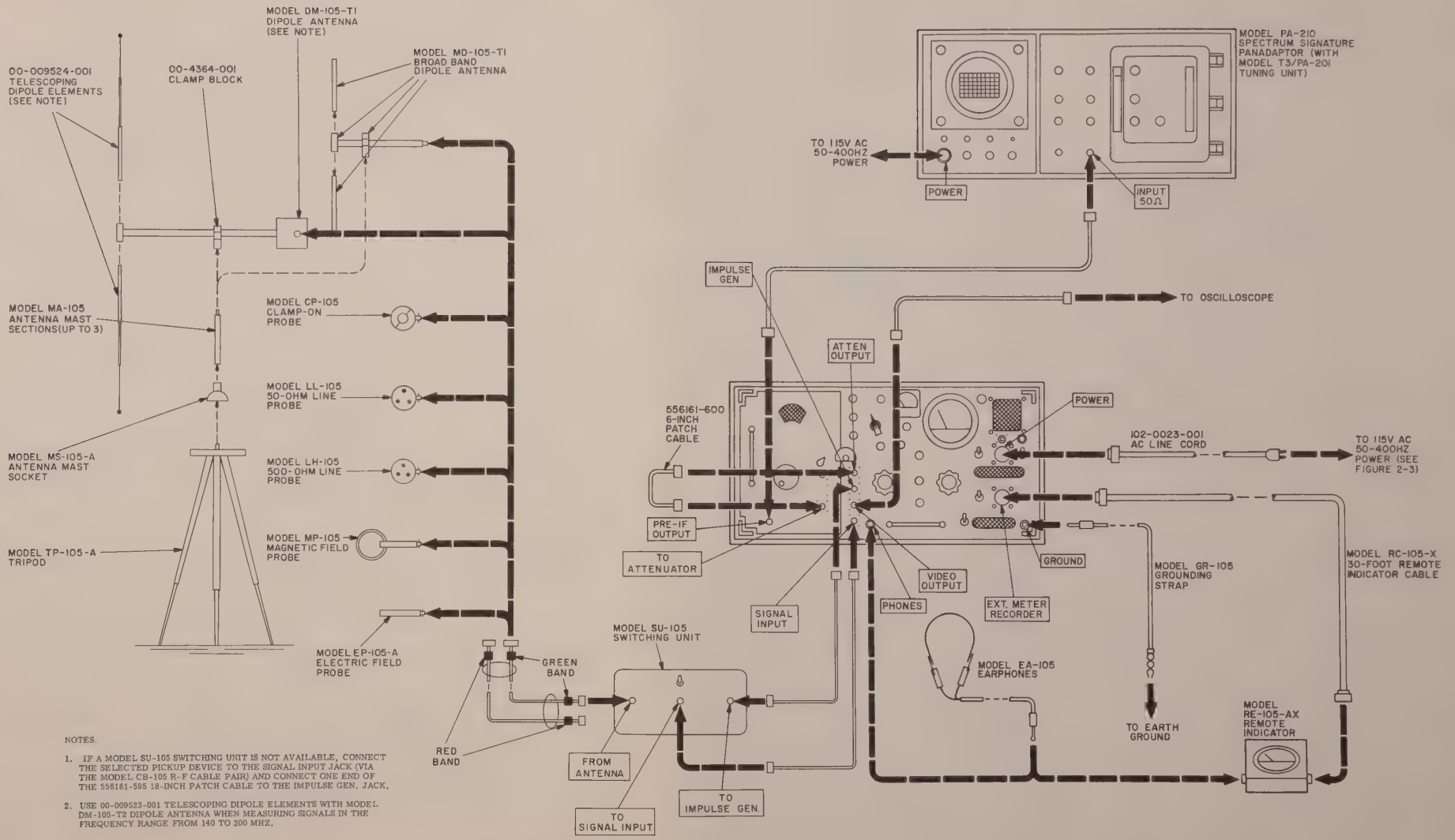
Figure 2-6. Typical Test Setup for Radiated Noise and Field Intensity Measurements for 14 to 150 kHz Employing Shunt Calibration Method



NOTE:

IF A MODEL SU-105 SWITCHING UNIT IS NOT AVAILABLE, CONNECT AN 18-INCH PATCH CABLE (556161-595) BETWEEN THE SIG. INPUT AND SIGNAL INPUT JACKS.

Figure 2-7. Typical Test Setups for Measurements from 150 kHz to 30 MHz Employing Shunt Calibration Method



NOTES.

1. IF A MODEL SU-105 SWITCHING UNIT IS NOT AVAILABLE, CONNECT THE SELECTED PICKUP DEVICE TO THE SIGNAL INPUT JACK (VIA THE MODEL CB-105 R-F CABLE PAIR) AND CONNECT ONE END OF THE 556161-595 18-INCH PATCH CABLE TO THE IMPULSE GEN. JACK.

2. USE 00-009523-001 TELESCOPING DIPOLE ELEMENTS WITH MODEL DM-105-T2 DIPOLE ANTENNA WHEN MEASURING SIGNALS IN THE FREQUENCY RANGE FROM 140 TO 200 MHZ.

Figure 2-8. Typical Test Setups for Measurements from 20 to 200 MHz Employing Shunt Calibration Method

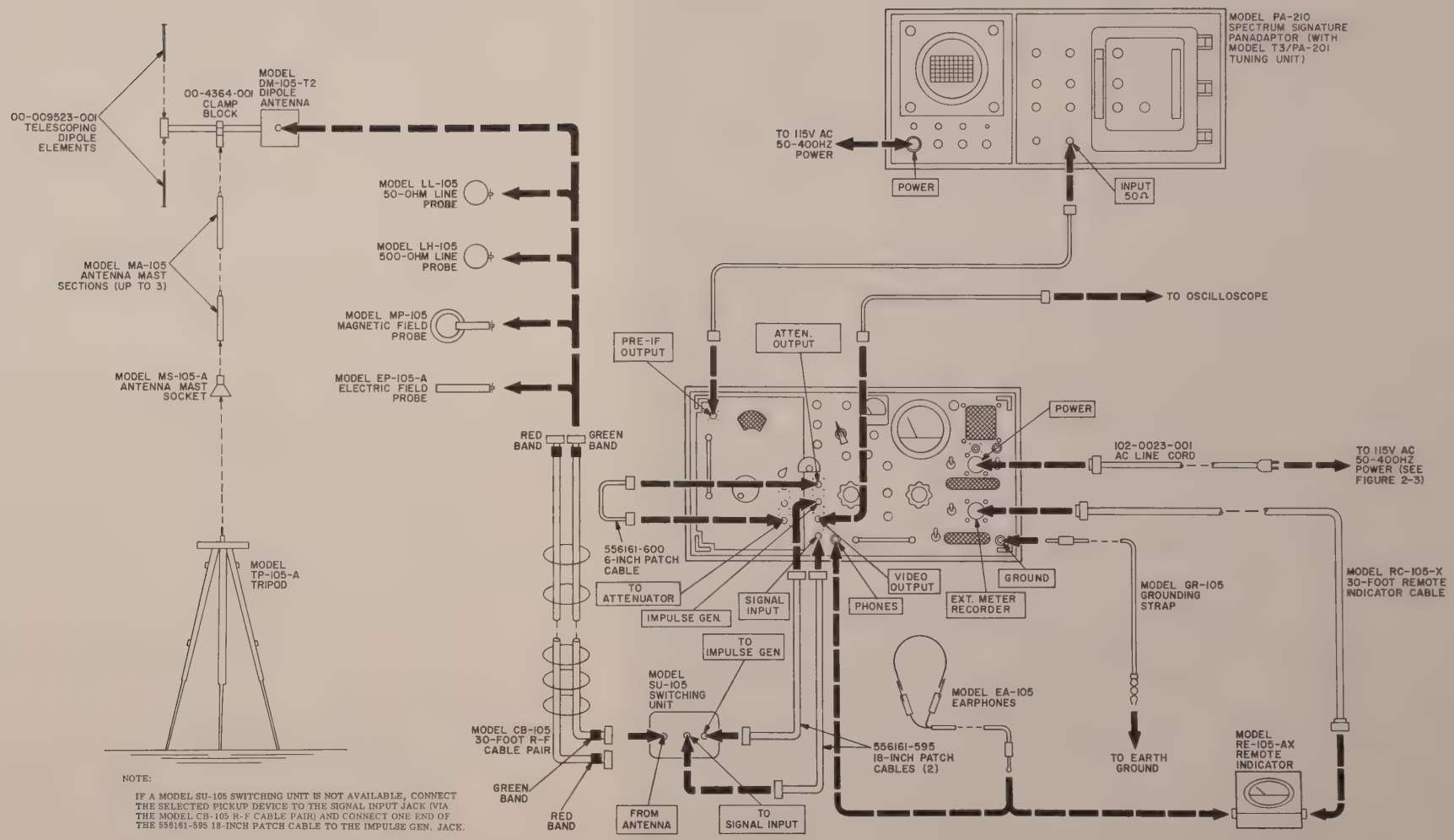
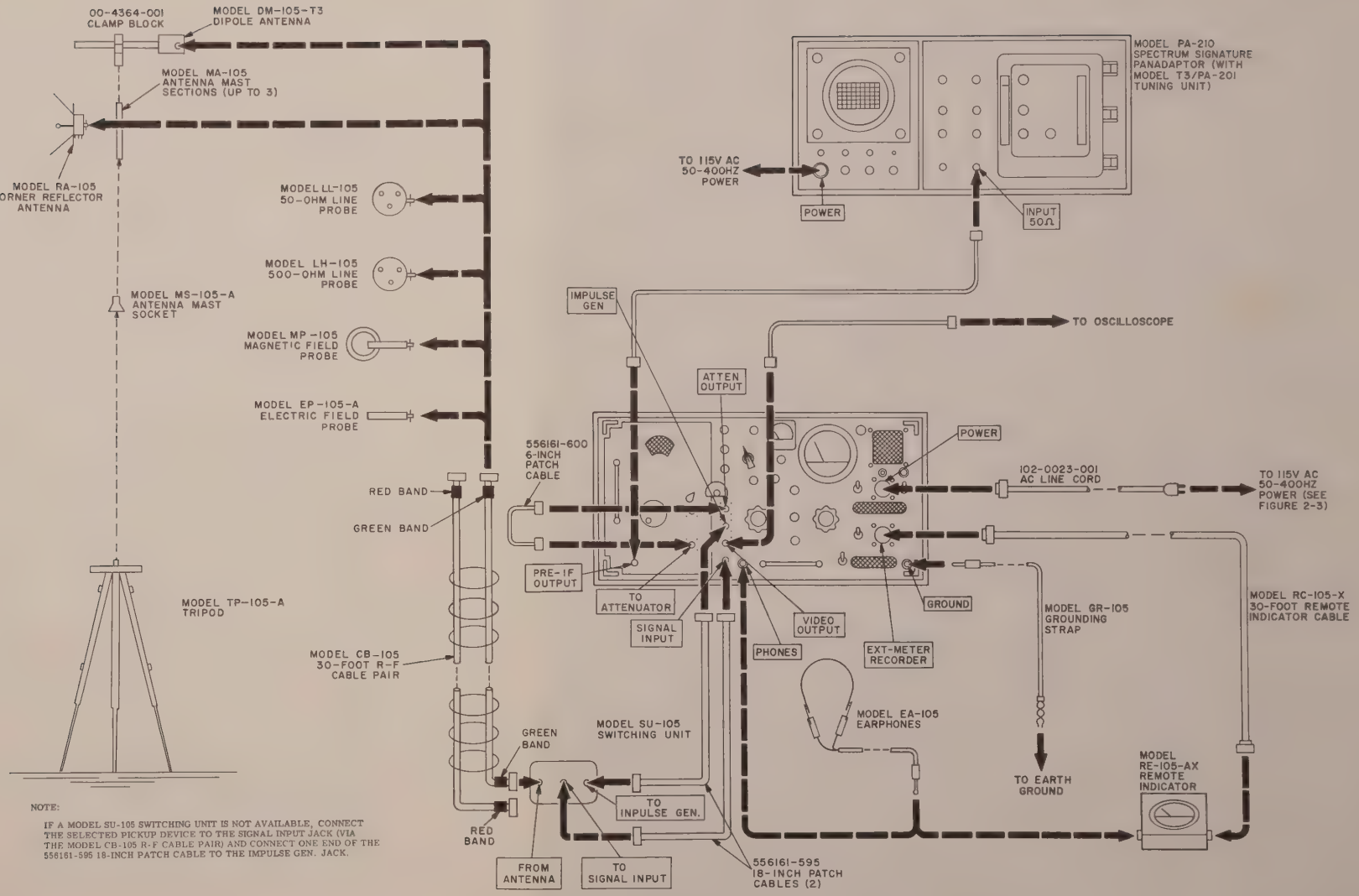


Figure 2-9. Typical Test Setups for Measurements from 200 to 400 MHz Employing Shunt Calibration Method



NOTE:

IF A MODEL SU-105 SWITCHING UNIT IS NOT AVAILABLE, CONNECT THE SELECTED PICKUP DEVICE TO THE SIGNAL INPUT JACK (VIA THE MODEL CB-105 R-F CABLE PAIR) AND CONNECT ONE END OF THE 556161-595 18-INCH PATCH CABLE TO THE IMPULSE GEN. JACK.

Figure 2-10. Typical Test Setups for Measurements from 400 to 1000 MHz Employing Shunt Calibration Method

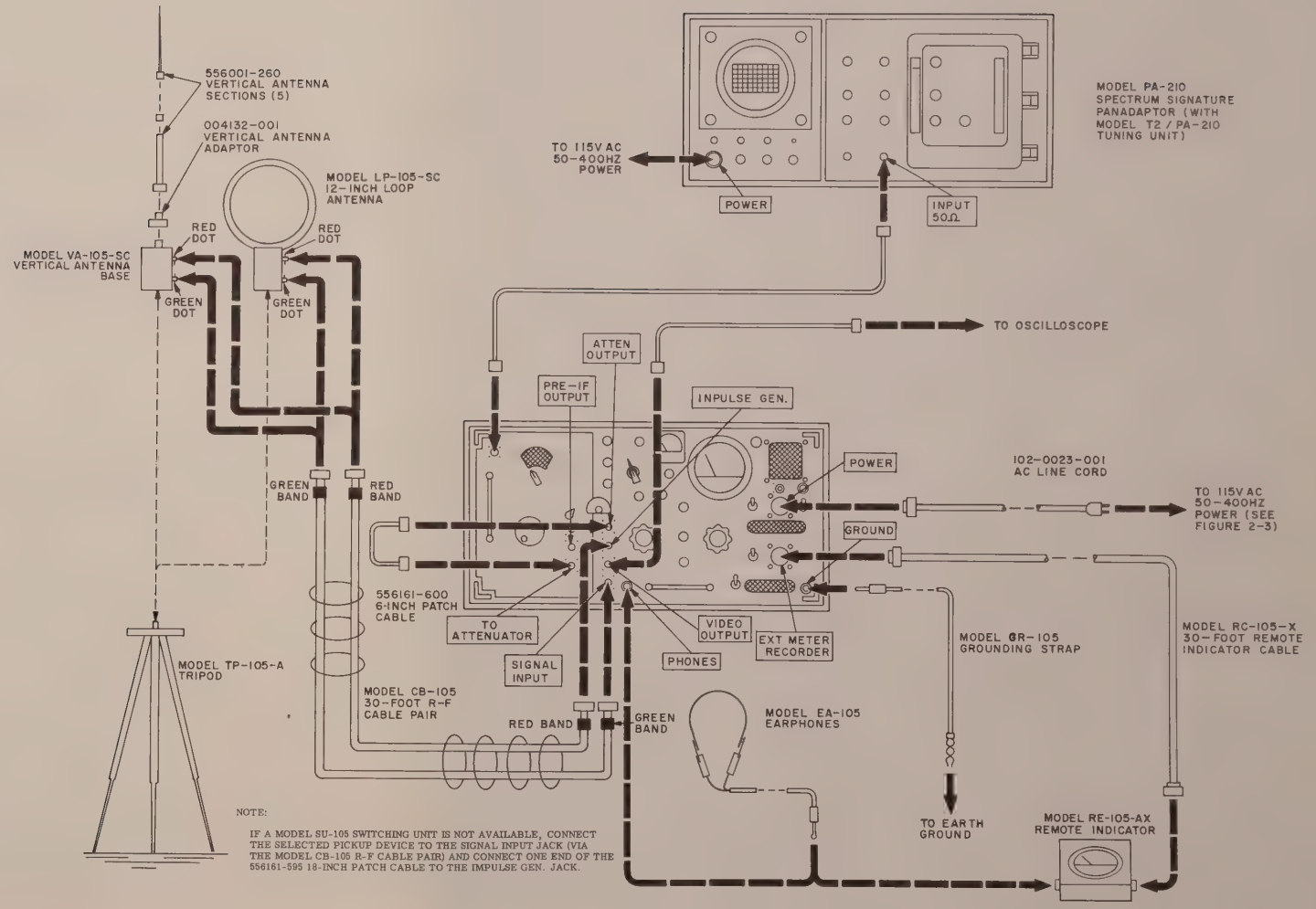


Figure 2-11. Typical Test Setup for Noise and Field Intensity Measurements from 150 kHz to 30 MHz Employing Series Calibration Method

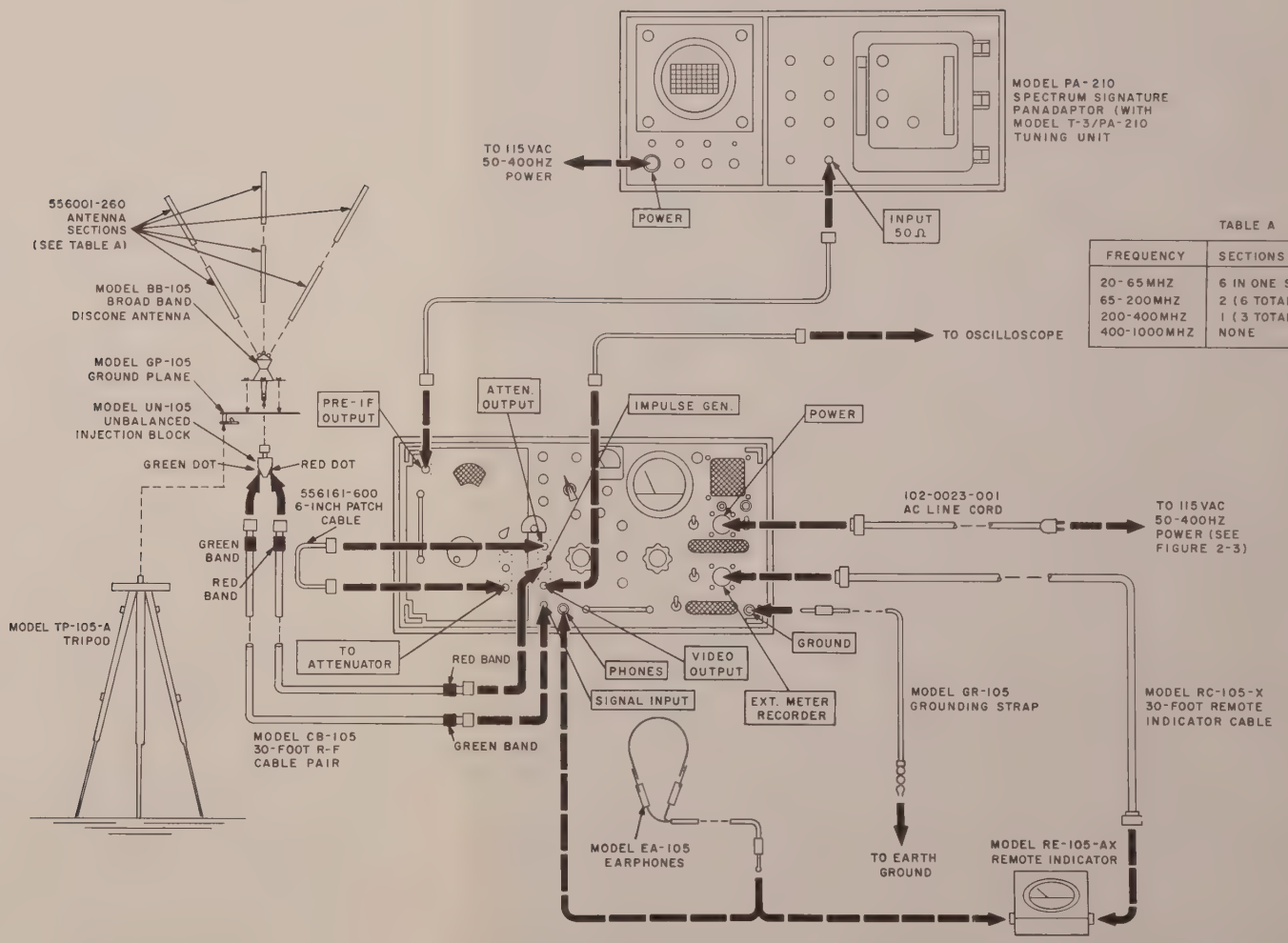


TABLE A

FREQUENCY	SECTIONS PER STUD HOLE
20-65MHZ	6 IN ONE STUD HOLE
65-200MHZ	2 (6 TOTAL)
200-400MHZ	1 (3 TOTAL)
400-1000MHZ	NONE

Figure 2-12. Typical Test Setup for Noise and Field Intensity Measurements from 20 to 1000 MHz Employing Series Calibration Method

TABLE 2-4. APPLICABLE CALIBRATION CHART FOR INSTALLED TUNING UNIT

Installed Tuning Unit	Applicable Calibration Chart
T-X/NF-105	Table 2-7
T-X/NF-105/M-126	Table 2-8
T-A/NF-105	Table 2-9
T-A/NF-105/M-126	Table 2-10
T-1/NF-105	Table 2-11
T-1/NF-105/M-126	Table 2-12
T-2/NF-105	Table 2-13
T-2/NF-105/M-126	Table 2-14
T-3/NF-105	Table 2-15
T-3/NF-105/M-126	Table 2-16

Note

When employing a rod or loop antenna, calibrate for 10,000 microvolts full-scale.

Note

The M-126/105/SUBTRACT 10DB switch must be set to 105 during calibration of the output meter.

(4) Set the IMPULSE GEN. switch to ON and adjust the IF GAIN to obtain an output meter pointer indication of 20 on the upper DB scale.

(5) Release the IMPULSE GEN. switch. (When a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is employed, set the IMPULSE GEN. switch to OFF.)

Note

Do not adjust the setting of the IF GAIN control after the output meter has been calibrated at the measurement frequency.

m. Set the Function Selector switch to CARRIER.

n. Set the SIGNAL INPUT ATTENUATOR DB and/or SIG. ATT. switch as noted for the signal frequency component.

o. Set the Model SU-105 Switching Unit switch to READ. (If a Model SU-105 Switching Unit is not available, reconnect the pickup device to the SIGNAL INPUT jack.)

p. Note the output meter pointer indication.

Notes

1. If the SIGNAL INPUT ATTENUATOR DB switch is set to 0, read the lower DB scale. For all other settings of the SIGNAL INPUT ATTENUATOR DB switch, read the upper DB scale.

2. If the output meter pointer deflects to an indication within the lower 10-dB range of the upper DB scale and the SIGNAL INPUT ATTENUATOR DB switch is set to any position other than 0, set the SUBTRACT 10DB switch (or M-126/105/SUBTRACT 10DB switch) to SUBTRACT 10DB to obtain an indication within the upper half of the scale.

3. If the output meter pointer deflects to an indication within the lower half of the lower DB scale when the SIGNAL INPUT ATTENUATOR DB switch is set to 0 and a Model T-1/NF-105/M-126, T-2/NF-105/M-126 or T-3/NF-105/M-126 Tuning Unit is installed in a Model BA-105/M-126 Basic Measuring Unit, set the M-126/105/SUBTRACT 10DB switch to M-126 to obtain an indication within the upper half of the scale.

q. Set the Function Selector switch to PEAK and again note the output meter pointer indication. If this indication is greater than that of step p, the narrow band signal is modulated. Note the output meter pointer indication on the appropriate meter

DB scale. (Refer to paragraph 2-35 to calculate the percentage modulation of the applied signal.)

r. The rms value of the signal within the bandpass of the equipment (see examples) is equal to the sum of the appropriate meter DB scale indication, the meter scale factor (obtained from the applicable tuning unit calibration chart), the setting of the SIGNAL INPUT DB switch, the setting of the SIG. ATT. switch (if a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is employed), the setting of the SUBTRACT 10DB switch or M-126/105/SUBTRACT 10DB (the latter if a Model BA-105/M-126 Basic Measuring Unit is employed in conjunction with an M-126 tuning unit), the attenuation of the 30-foot length of r-f cable connecting the switching unit to the pickup device and the factor of the pickup device employed. The dB factors for the various pickup devices capable of being employed when making conducted signal measurements are listed in table 2-5.

s. Repeat steps 1 through r for the remaining signal frequency components within the range of the tuning unit in use.

EXAMPLES

1. Assume that, with a Model LH-105 500-Ohm Line Probe employed, a Model T-3/NF-105 Tuning Unit tuned to 900 MHz produces an output meter indication on the lower half of the upper DB scale when the SIGNAL INPUT ATTENUATOR DB switch is set to 40. Depressing the SUBTRACT 10DB switch results in an output meter indication of 18 on the upper DB scale. The actual signal level is calculated as follows:

Meter DB scale indication	18 dB
Meter scale factor (from table 2-15)	0 dB
SUBTRACT 10DB switch factor	-10 dB
SIGNAL INPUT ATTENUATOR DB switch factor	40 dB
Cable attenuation factor (from figure 2-21)	4.7 dB
Pickup device factor (from table 2-5)	20 dB
Actual signal level	72.7 dB above 1 μV (approx. 3000 μV)

2. Assume that, with a Model CP-105 Clamp-on Probe employed, a Model T-1/NF-105/M-126 Tuning Unit tuned to 50 MHz produces an output meter indication of 17 on the lower DB scale when the M-126/105/SUBTRACT 10DB switch is set to M-126 and the SIGNAL INPUT ATTENUATOR DB switch is set to 0. (Assume that the M-126/105/SUBTRACT 10DB switch factor is -14 dB.*) The actual signal level is calculated as follows:

Meter DB scale indication	17 dB
Meter scale factor (from table 2-12)	-20 dB
M-126/105/SUBTRACT 10DB switch factor	-14 dB
SIGNAL INPUT ATTENUATOR DB switch factor	0 dB
Cable attenuation factor (from figure 2-21)	0.95 dB
Pickup device factor (from table 2-5)	0 dB
Actual signal level	-16.05 dB above 1 μV (approx. 0.15 μV)

* Refer to notice following table 2-5 for actual M-126/105/SUBTRACT 10DB switch factor.

TABLE 2-5. PICKUP DEVICE DB FACTORS

Pickup Device	Db Factor
Model CP-105 Clamp-on Probe	See Figure 2-13
Model LB-105 50-Ohm Line Probe	0 dB
Model LA-105 50-Ohm Line Probe	0 dB
Model LF-105 500-Ohm Line Probe	20 dB
Model LL-105 50-Ohm Line Probe	0 dB
Model LH-105 500-Ohm Line Probe	20 dB

NOTICE

The dB factor to be employed when the M-126/105/SUBTRACT 10DB switch of Model BA-105/M-126 Basic Measuring Unit Serial No. _____ is set to M-126 is _____dB.

2-28. MEASUREMENT OF BROAD BAND CONDUCTED SIGNALS. To measure the level of broad band conducted signals, proceed as directed in the following steps. (This procedure assumes that the signal frequency is not known. If the signal frequency is known, perform steps a and b and then continue at step 1.)

a. Energize the equipment and perform the preliminary adjustments detailed in paragraphs 2-16 through 2-19.

CAUTION

DO NOT CONNECT LINE PROBES ACROSS POWER LINE LEADS HAVING A POTENTIAL DIFFERENCE EXCEEDING 500 VOLTS.

b. Set the Model SU-105 Switching Unit switch to CALIBRATE. (If a Model SU-105 Switching Unit is not available, perform steps c through e before coupling the selected pickup device to the SIGNAL INPUT jack.)

c. Set the INPUT ATTENUATOR DB switch to 0. (If a Model T-X/NF-105 Tuning Unit is installed, set the tuning unit SIG. ATT. switch to -20DB.)

d. Set the BAND SELECTOR switch to the lowest frequency band (the Model T-2/NF-105 Tuning Unit does not have a BAND SELECTOR switch) and rotate the TUNING control clockwise to obtain a kHz or MHz dial indication corresponding to the low-frequency end of the selected band.

e. Adjust the IF GAIN CONTROL to obtain an output meter pointer noise indication of approximately 4 on the upper DB scale.

f. Set the Model SU-105 Switching Unit switch to READ. (If a Model SU-105 Switching Unit is not available, couple the selected pickup device to the SIGNAL INPUT jack via a Model CB-105 R-f Cable Pair.)

g. Slowly rotate the TUNING control clockwise to scan the band in search of the presence of a broad band signal. Signal interception will cause the output meter pointer to rise upscale above noise as the signal enters the equipment passband.

Note

For aural monitoring of applied signals, plug the Model EA-105 Earphones into the PHONES receptacle. The loudness of the aural indication can be adjusted to a comfortable level by means of the VOLUME control.

h. Continue rotating the TUNING control clockwise until a maximum output meter pointer deflection is obtained. Should the output meter pointer deflect

to an off-scale indication before reaching a maximum:

(1) If a Model T-X/NF-105 Tuning Unit is installed, set the SIG. ATT. switch to NORM.;

(2) If a Model T-A/NF-105 through T-3/NF-105 Tuning Unit is installed, set the SIGNAL INPUT ATTENUATOR DB switch to 20.

i. Continue rotating the TUNING control clockwise (inserting r-f attenuation as necessary by means of the SIGNAL INPUT ATTENUATOR DB switch) until a maximum output meter pointer deflection is obtained. Note the frequency at which this maximum occurs and the setting of the SIGNAL INPUT ATTENUATOR DB switch and/or SIG. ATT. switch.

j. Continue rotating the tuning control clockwise. The output meter pointer will start to drop downscale after the maximum intensity point of the broad band signal leaves the equipment bandpass. Remove r-f attenuation (by means of the SIGNAL INPUT ATTENUATOR DB and SIG. ATT. switches), while simultaneously rotating the TUNING control, until the output meter pointer again indicates noise when in its most sensitive condition or the pointer once again rises upscale to indicate the interception of another broad band signal.

k. Repeat steps h through j until all broad band signal components within the frequency range of the installed tuning unit have been noted.

l. Tune the equipment to the frequency of the intercepted broad band signal and set the SIGNAL INPUT ATTENUATOR DB and/or SIG. ATT. switch as noted in step i.

m. Set the Model SU-105 Switching Unit switch to CALIBRATE. (If a Model SU-105 Switching Unit is not available, couple the cable from either the IMPULSE GEN. or IMPULSE GEN. OUTPUT jack to the SIGNAL INPUT jack.)

n. Set the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. OUTPUT control, while the IMPULSE GEN. switch is held in the ON position, to obtain an output meter indication as close as possible to that noted in step i. Note the level of the impulse generator output. (If a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is installed, set the IMPULSE GEN. LEVEL DBMHZ switches to obtain an output meter indication as close as possible to that noted in step i. Note the level of the impulse generator output.)

Note

If the maximum output of the impulse generator fails to provide an output meter indication in the vicinity of that noted in step i, remove r-f attenuation, in 20-dB increments (by means of the SIGNAL INPUT ATTENUATOR DB switch or SIG. ATT. switch) and re-adjust the impulse generator output level until an output meter indication as close as possible to that noted in step i is obtained. For each 20-dB of attenuation removed, add 20-dB to the impulse generator output level.

Conversely, if the minimum output of the impulse generator fails to provide an output meter indication in the vicinity of that noted in step i, insert attenuation, in 20-dB increments and re-adjust the impulse generator output level until an output meter indication as close as possible to that noted in step i is obtained. For each 20-dB of attenuation inserted, subtract 20-dB from the impulse generator output level.

o. The value of the broad band signal within the bandpass of the equipment (see example) is equal to the algebraic sum of the impulse generator output level, the attenuation of the r-f cabling between the pickup device employed and the SIGNAL INPUT jack and the dB factor of the pickup device. The dB factors of the various pickup devices capable of being employed when making broad band conducted signal measurements are listed in table 2-5.

p. Repeat steps l through o for the remaining signal frequency components within the range of the installed tuning unit.

EXAMPLE

Assume that, with a Model LH-105 500-Ohm Line Probe coupled to the SIGNAL INPUT jack via a Model CB-105 R-f Cable Pair, a Model T-3/NF-105 Tuning Unit tuned to 400 MHz produced an output meter indication of 13 on the upper DB scale when the SIGNAL INPUT ATTENUATOR DB switch was set to 40. The impulse generator output level necessary to obtain this indication is 74 dB above 1uV/MHz. The actual level of the broad band signal is calculated as follows:

Impulse generator output level	74 dB above 1uV/MHz
Cable attenuation factor (from figure 2-23)	3 dB
Pickup device factor (from table 2-5)	20 dB
Actual broad band signal level	97 dB above 1uV/MHz

2-29. MEASUREMENT OF NARROW BAND RADIATED SIGNALS. The procedure for measuring the level of narrow band radiated signals is basically the same as that for measuring narrow band conducted signals, the only difference being the pickup device employed and the calculation of the radiated signal level. (Refer to paragraph 2-27.)

2-30. The intensity of the radiated signal within the bandpass of the equipment (see example) is equal to the sum of the appropriate meter DB scale indication, the meter scale factor (obtained from the applicable tuning unit calibration chart), the setting of the SIGNAL INPUT ATTENUATOR DB switch, the setting of the SIG. ATT. switch (if a Model T-X/NF-105 or T-X/NF-105/M-126 Tuning Unit is employed), the setting of the SUBTRACT 10DB switch or M-126/105/SUBTRACT 10DB switch (the latter if a model BA-105/M-126 Basic Measuring Unit is employed in conjunction with an M-126 tuning unit), the attenuation of the 30-foot length of r-f cable and the antenna factor of the pickup device employed. The dB factors of the various antennas capable of being employed when making radiated signal measurements are listed in table 2-6.

Notes

1. The dB factor for the loop and dipole antennas (when added to the meter scale indication, scale factor and attenuation factors) yields field strength in μV/m (narrow band) or μV/m/MHz (broad band).

2. The dB factor for the 41-inch rod antennas yields antenna-induced open circuit voltages in μV (narrow band) or μV/MHZ (broad band). To obtain field intensity in μV/m or μV/m/MHz, respectively, add 6 dB (antenna effective height factor).

EXAMPLE

Assume that, with a Model VR-1-105 41-Inch Telescoping Vertical Antenna employed, a Model T-X/NF-105 Tuning Unit tuned to 100 kHz produces an output meter indication of 12 on the upper DB scale when the SIGNAL INPUT ATTENUATOR DB switch is set to 20 and the SIG. ATT. switch is set to NORM. (The meter has been calibrated for 10,000 microvolts full-scale.) The actual narrow band signal intensity is calculated as follows:

Meter DB scale indication	12 dB
Meter scale factor (from table 2-7)	-20 dB
SUBTRACT 10DB switch factor	0 dB
SIGNAL INPUT ATTENUATOR DB switch factor	20 dB
SIG. ATT. switch factor	0 dB
Cable attenuation (from figure 2-21)	0 dB
Antenna factor (from figure 2-14)	46 dB
Antenna-induced open-circuit output	58 dB above 1 μV

The field strength is equal to the sum of the antenna-induced open-circuit output voltage plus 6 dB (antenna effective height)

Field Strength	64 dB above 1 μV/m

TABLE 2-6. ANTENNA DB FACTOR REFERENCE CHART

Antenna	dB Factor
Model LG-105-A 36-Inch Loop Antenna*	See figure 2-14
Model VR-1-105 41-Inch Telescoping Vertical Antenna*	See figure 2-15
Model VX-105 41-Inch Telescoping Vertical Antenna*	See figure 2-16
Model LP-105 12-Inch Loop Antenna*	See figure 2-17
Model VA-105 41-Inch Telescoping Vertical Antenna*	See figure 2-18
Model LP-3-105 36-Inch Loop Antenna*	See figure 2-19
Model DM-105-T1, DM-105-T2 and DM-105-T3 Dipole Antennas	See figure 2-20
Model RA-105 Corner Reflector Antenna	See figure 2-21
Model MD-105-T1 Broad Band Dipole Antenna	See figure 2-22

*Calibrate meter for 10,000 microvolt full-scale sensitivity.

2-31. MEASUREMENT OF BROAD BAND RADIATED SIGNALS. Two techniques are available for measuring the intensity of broad band radiated signals. The first (shunt calibration) technique is described in paragraph 3-32; the second (series calibration) technique is described in paragraph 2-33.

2-32. Shunt Calibration Technique. The shunt calibration technique is basically the same as that for measuring broad band conducted signals (refer to paragraph 2-28), the only difference being the pickup device employed and the calculation of the radiated signal intensity. The intensity of the intercepted signal is equal to the sum of the appropriate meter DB scale indication, the setting of the SIGNAL INPUT ATTENUATOR DB switch and/or the setting of the SIG. ATT. switch, the attenuation of the 30-foot length of r-f cable and the factor of the pickup device employed. The dB factors of the various pickup devices capable of being used when making broad band radiated signal measurements are listed in table 2-6.

2-33. Series Calibration Technique. To determine the intensity of broad band radiated signals by this technique, proceed as directed in the following steps.

a. Energize the equipment and perform the preliminary adjustments detailed in paragraphs 2-16 through 2-19.

b. Set the Model SU-105 Switching Unit switch to CALIBRATE. (If a Model SU-105 Switching Unit is not available, perform steps c through e before coupling the selected pickup device to the SIGNAL INPUT jack.)

c. Set the SIGNAL INPUT ATTENUATOR DB switch to 0.

d. Set the BAND SELECTOR switch to the lowest frequency band (the Model T-2/NF-105 Tuning Unit does not have a BAND SELECTOR switch) and rotate the TUNING control counterclockwise to obtain an MHz dial indication corresponding to the low-frequency end of the selected band.

e. Adjust the IF GAIN control to obtain an output meter pointer indication of approximately 4 on the upper DB scale.

f. Set the Model SU-105 Switching Unit switch to READ. (If a Model SU-105 switching Unit is not available, couple the selected pickup device to the SIGNAL INPUT jack via a Model CB-105 R-f Cable Pair.)

g. Slowly rotate the TUNING control clockwise to scan the band in search of the presence of a broad band signal. Signal interception will cause the output meter pointer to rise upscale above noise as the signal enters the equipment passband.

Note

For aural monitoring of applied signals, plug the Model EA-105 Earphones into the PHONES receptacle. The loudness of the aural indication can be adjusted to a comfortable level by means of the VOLUME control.

h. Continue rotating the TUNING control clockwise until a maximum output meter pointer deflection is obtained. Should the output meter pointer deflect to an Off-scale indication before reaching a maximum, set the SIGNAL INPUT ATTENUATOR DB switch to 20.

i. Continue rotating the TUNING control clockwise (inserting r-f attenuation as necessary by means of the SIGNAL INPUT ATTENUATOR DB switch) until a maximum output meter pointer deflection is obtained. Note the frequency at which this maximum occurs and the setting of the SIGNAL INPUT ATTENUATOR DB switch.

j. Continue rotating the TUNING control clockwise. The output meter pointer will start to drop downscale after the maximum intensity point of the signal leaves the equipment bandpass. Remove r-f attenuation (by means of the SIGNAL INPUT ATTENUATOR DB switch), while simultaneously rotating the TUNING control, until the output meter pointer again indicates noise when in its most sensitive condition or the pointer once again rises upscale to indicate the interception of another signal component.

k. Repeat steps h through j until all broad band signal components within the frequency range of the installed tuning unit have been noted.

l. Tune the equipment to the frequency of the intercepted broad band signal and set the SIGNAL INPUT ATTENUATOR DB switch to obtain an on-scale output meter indication. Note both the meter indication and the setting of the SIGNAL INPUT ATTENUATOR DB switch. Do not reset the SIGNAL INPUT ATTENUATOR DB switch for the remainder of the measurement at this frequency.

m. If the source of radiation can be shut down, do so.

n. Set the IMPULSE GEN. switch to ON and adjust the impulse generator output level (by means of the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. OUTPUT control) to obtain an output meter indication equal to that noted in step l. (If the source of broad band radiation cannot be shut down, adjust the impulse generator output level to obtain an output meter indication 1 dB greater than that noted in step l.

o. Note the output level of the impulse generator.

p. De-energize the impulse generator.

q. The intensity of the broad band signal is equal to the impulse generator output level less 20 dB less the attenuation of the 30-foot r-f cable (see figure 2-23).

r. Repeat steps l through q for the remaining frequencies within the range of the tuning unit.

2-34. MEASUREMENT OF BROAD BAND SIGNALS BY THE SLIDEBACK METHOD. Should two or more broadband signals occur simultaneously at the same frequency and be of different amplitude and/or repetition rate, the normal technique for signal measurement will permit the operator to determine the intensity of only the stronger of the two signals. Similarly, if the repetition rate of the broad band signal is very low, the response of the metering circuitry will cause the output meter pointer to fluctuate, thereby making measurement difficult. To measure such signals accurately, employ the slideback technique described in the following steps.

a. Perform steps a through k of paragraph 2-28.

b. Tune the equipment to the frequency of the intercepted signal.

c. Set the SLIDEBACK control fully counterclockwise.

d. Adjust the VOLUME control to obtain a comfortable aural indication of the signal repetition rate.

e. Carefully rotate the SLIDEBACK control clockwise. The intensity of the aural indication will decrease as the control is adjusted. Alternately adjust both the SLIDEBACK and VOLUME controls until the aural indication is just at the threshold of audibility when the VOLUME control is set fully clockwise.

Note

Do not reset the SLIDEBACK control for the remainder of the procedure at the frequency of measurement.

f. Set the Model SU-105 Switching Unit switch to CALIBRATE.

g. Energize the impulse generator and adjust the impulse generator output level until the aural indication of the impulse generator repetition rate is just at the threshold of audibility. (Note that it may be necessary to reset the positions of the SIGNAL INPUT ATTENUATOR DB switch and/or the SIG. ATT. switch. If this is required, note the setting of these switches.)

h. Note the output level of the impulse generator.

i. The intensity of the broadband signal is equal to the sum of the output level of the impulse generator (noted in step h), the difference between the settings of the SIGNAL INPUT ATTENUATOR DB and/or SIG. ATT. switches for when the broad band signal

under measurement is applied and that for when the impulse generator signal is applied and the attenuation due to the 30-foot r-f cable. Thus, if the total insertion loss of the r-f attenuators was reduced to permit the impulse generator output level to reach the threshold of audibility, this difference must be added to the impulse generator output level and cable attenuation. Conversely, if the total insertion loss of the r-f attenuators was increased to permit the impulse generator output level to reach the threshold of audibility, this difference must be subtracted from the sum of the impulse generator output level and the cable attenuation.

j. De-energize the impulse generator after the measurement has been made.

k. Set the Model SG-196 Switching Unit switch to READ and repeat steps a through j for the remaining signal frequencies within the range of the tuning unit in use.

2-35. DETERMINING THE PERCENTAGE MODULATION OF MODULATED CW SIGNALS. To evaluate the percentage modulation of a narrow band signal, first determine the magnitude (in microvolts) of the signal when the Function Selector switch is set to CARRIER. Then determine the magnitude (in microvolts) when the Function Selector switch is set to PEAK. The percentage modulation can be calculated using the formula

$$\% \text{ Modulation} = \frac{E_{PEAK} - E_{CARRIER}}{E_{CARRIER}} \times 100.$$

2-36. TUNING UNIT CALIBRATION CHARTS, ANTENNA AND PROBE FACTORS AND CONVERSION NOMOGRAPHS. The information necessary for the calibration of the equipment when making narrow band signal measurements is contained in tables 2-7 through 2-16. The antenna and probe factors for the various pickup devices are supplied in figures 2-13 through 2-22. The frequency-attenuation characteristics of the 30-foot r-f cable is presented in figure 2-23 and the conversion nomographs for the various measurement units are contained in figures 2-14 through 2-16.

2-37. STOPPING PROCEDURE. To shut down the equipment, set the basic unit POWER switch to OFF and de-energize all other auxiliary equipment.

2-38. PACKAGING INSTRUCTIONS.

2-39. SHORT TERM STORAGE. If the equipment is to be stored for a short time, protect the equipment with a sheet of paper or plastic and store the equipment in a clean and dry area that is not subject to extreme variations in temperature.

2-40. LONG TERM STORAGE OR SHIPMENT. If the equipment is to be stored for a long time, or shipped, proceed as directed in the following steps.

a. If the original wrappings and cartons have been saved, package the equipment as illustrated in figure 2-29.

b. If new packing material is to be employed, first wrap the equipment in a moistureproof barrier such as a plastic bag. Place the equipment in a suitable box or carton and fill all empty spaces with suitable filler material to prevent possible shifting of the equipment. Seal the box or carton. Should conditions warrant rugged packaging, enclose the sealed box or carton in an outer wooden crate or metal transit case.

TABLE 2-7. CALIBRATION CHART FOR MODEL T-X/NF-105 TUNING UNIT (SERIAL NO. _____)

Band	Frequency (kHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set SIG. ATT. Switch to	Set IMPULSE GEN. LEVEL (DBMHZ) Switches to		Meter Scale Factor (dB)
1 (14 to 25 kHz)	14	20	NORM.			0
	15					
	16					
	18					
	20					
	22					
	24					
	25					
2 (25 to 62 kHz)	25					
	30					
	35					
	40					
	45					
	50					
	55					
	60					
3 (62 to 150 kHz)	62					
	65					
	70					
	75					
	80					
	90					
	100					
	110					
	120					
	130					
	140					
	150	20	NORM.			0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80 and SIG. ATT. switch is set to NORM.), set the SIGNAL INPUT ATTENUATOR DB switch to 40 instead of 20 and set the SIGNAL INPUT ATTENUATOR DB switch, the SIG. ATT. switch and IMPULSE GEN. LEVEL DBMHZ switches as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-8. CALIBRATION CHART FOR MODEL T-X/NF-105/M-126 TUNING UNIT (SERIAL NO._____)

Band	Frequency (kHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set SIG. ATT. Switch to	Set IMPULSE GEN. LEVEL (DBMHZ) Switches to		Meter Scale Factor (dB)
1 (14 to 25 kHz)	14	0	NORM.			0
	15					
	16					
	18					
	20					
	22					
	24					
	25					
2 (25 to 62 kHz)	25					
	30					
	35					
	40					
	45					
	50					
	55					
	60					
3 (62 to 150 kHz)	62					
	65					
	70					
	75					
	80					
	90					
	100					
	110					
	120					
	130					
	140					
	150	0	NORM.			0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80 and SIG. ATT. switch is set to NORM.), set the SIGNAL INPUT ATTENUATOR DB switch to 20 instead of 0 and set the SIGNAL INPUT ATTENUATOR DB switch, the SIG. ATT. switch and IMPULSE GEN. LEVEL DBMHZ switches as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-9. CALIBRATION CHART FOR MODEL T-A/NF-105 TUNING UNIT (SERIAL NO._____)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (0.15 to 0.36 MHz)	0.15	20					0
	0.175						
	0.20						
	0.225						
	0.25						
	0.275						
	0.30						
	0.325						
	0.36						
2 (0.36 to 0.87 MHz)	0.36						
	0.40						
	0.45						
	0.50						
	0.56						
	0.62						
	0.70						
	0.76						
	0.82						
	0.87						
3 (0.87 to 2.1 MHz)	0.87						
	0.90						
	1.00						
	1.10						
	1.30						
	1.50						
	1.70						
	1.90						
	2.10						
4 (2.1 to 5.2 MHz)	2.10						
	2.40						
	2.70						
	3.00						
	3.40						
	3.70						
	4.00						
	4.40						
	4.70						
	5.20						
5 (5.2 to 12.7 MHz)	5.20						
	6.00						
	7.00						
	8.00						
	9.00						
	10.0						
	11.0						
	12.7						
6 (12.7 to 30 MHz)	12.7						
	15.0						
	19.0						
	21.0						
	24.0						
	27.0						
	30.0	20					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 40 instead of 20 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. LEVEL control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-10. CALIBRATION CHART FOR MODEL T-A/NF-105/M-126 TUNING UNIT (SERIAL NO. ——)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (0.15 to 0.36 MHz)	0.15	0					0
	0.175						
	0.20						
	0.225						
	0.25						
	0.275						
	0.30						
	0.325						
	0.36						
2 (0.36 to 0.87 MHz)	0.36						
	0.40						
	0.45						
	0.50						
	0.56						
	0.62						
	0.70						
	0.76						
	0.82						
	0.87						
3 (0.87 to 2.1 MHz)	0.87						
	0.90						
	1.00						
	1.10						
	1.30						
	1.50						
	1.70						
	1.90						
	2.10						
4 (2.1 to 5.2 MHz)	2.10						
	2.40						
	2.70						
	3.00						
	3.40						
	3.70						
	4.00						
	4.40						
	4.70						
	5.20						
5 (5.2 to 12.7 MHz)	5.20						
	6.00						
	7.00						
	8.00						
	9.00						
	10.0						
	11.0						
	12.7						
6 (12.7 to 30 MHz)	12.7						
	15.0						
	19.0						
	21.0						
	24.0						
	27.0						
	30.0	0					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 20 instead of 0 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. LEVEL control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-11. CALIBRATION CHART FOR MODEL T-1/NF-105 TUNING UNIT (SERIAL NO. _____)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (20 to 65 MHz)	20	20					0
	30						
	40						
	50						
	60						
	65						
2 (62 to 200 MHz)	62						
	80						
	100						
	120						
	140						
	160						
	180						
	200	20					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch is 40 instead of 20 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. LEVEL control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-12. CALIBRATION CHART FOR MODEL T-1/NF-105/M-126 TUNING UNIT (SERIAL NO. _____)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (20 to 65 MHz)	20	0					0
	30						
	40						
	50						
	60						
	65						
2 (62 to 200 MHz)	62						
	80						
	100						
	120						
	140						
	160						
	180						
	200	0					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 20 instead of 0 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. OUTPUT control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-13. CALIBRATION CHART FOR MODEL T-2/NF-105 TUNING UNIT (SERIAL NO._____)

Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
200	20					0
210						
220						
240						
260						
280						
300						
320						
340						
360						
380						
400	20					0

Note: To calibrate for full-scale = 10, 000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 40 instead of 20 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. LEVEL control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-14. CALIBRATION CHART FOR MODEL T-2/NF-105/M-126 TUNING UNIT (SERIAL NO._____)

Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
200	0					0
210						
220						
240						
260						
280						
300						
320						
340						
360						
380						
400	0					0

Note: To calibrate for full-scale = 10, 000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 20 instead of 0 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. OUTPUT control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-15. CALIBRATION CHART FOR MODEL T-3/NF-105 TUNING UNIT (SERIAL NO. _____)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (400 to 700 MHz)	400	20					0
	425						
	450						
	475						
	500						
	525						
	550						
	575						
	600						
	625						
	650						
	675						
	700						
2 (700 to 1000 MHz)	700						
	725						
	750						
	775						
	800						
	825						
	850						
	875						
	900						
	925						
	950						
	975						
	1000	20					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 40 instead of 20 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. LEVEL control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

TABLE 2-16. CALIBRATION CHART FOR MODEL T-3/NF-105/M-126 TUNING UNIT (SERIAL NO. _____)

Band	Frequency (MHz)	Set SIGNAL INPUT ATTENUATOR DB Switch to	Set IMPULSE GEN. OUTPUT DBMHZ Switch to		Adjust ADD TO IMPULSE GEN. OUTPUT Control for Meter Indication of		Meter Scale Factor (dB)
1 (400 to 700 MHz)	400	0					0
	425						
	450						
	475						
	500						
	525						
	550						
	575						
	600						
	625						
	650						
	675						
	700						
2 (700 to 1000 MHz)	700						
	725						
	750						
	775						
	800						
	825						
	850						
	875						
	900						
	925						
	950						
	975						
	1000	0					0

Note: To calibrate for full-scale = 10,000 microvolts (when SIGNAL INPUT ATTENUATOR DB switch is set to 80), set the SIGNAL INPUT ATTENUATOR DB switch to 20 instead of 0 and set both the IMPULSE GEN. OUTPUT DBMHZ switch and ADD TO IMPULSE GEN. OUTPUT control as specified above. The meter scale factor is now -20 dB instead of 0 dB.

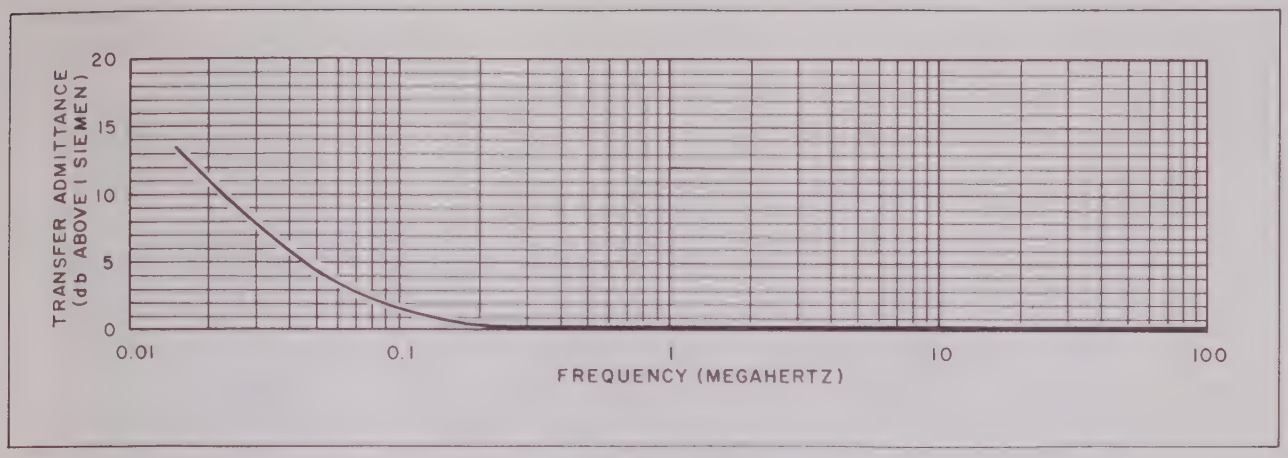


Figure 2-13. Transfer Admittance Versus Frequency Characteristics, Model CP-105 Clamp-On Probe

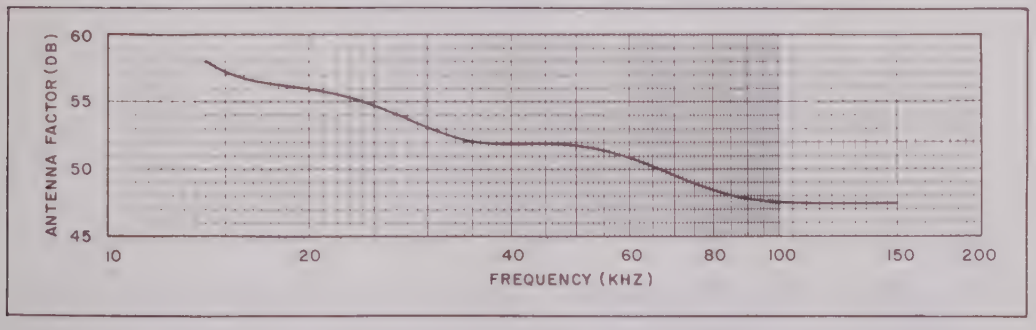


Figure 2-14. Antenna Factor Versus Frequency Characteristics, Model LG-105-A 36-Inch Loop Antenna

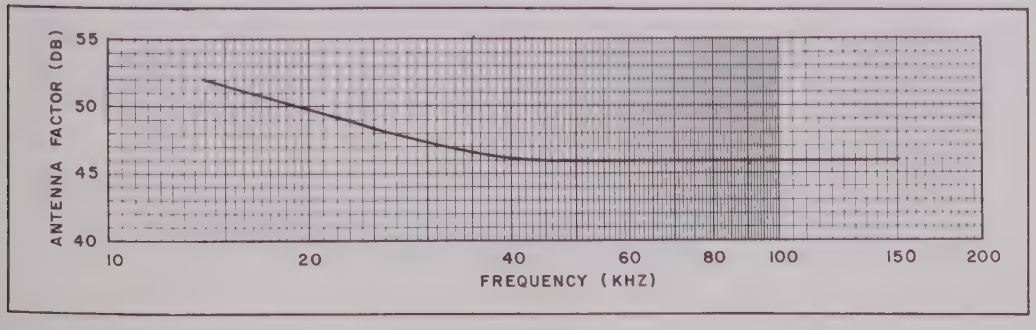


Figure 2-15. Antenna Factor Versus Frequency Characteristics, Model VR-1-105 41-Inch Vertical Antenna

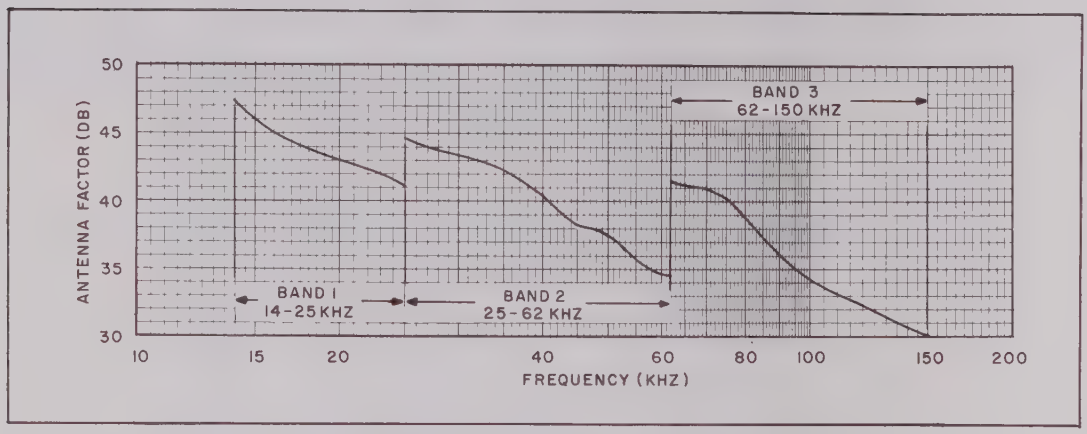


Figure 2-16. Typical Antenna Factor Versus Frequency Characteristics, Model VX-105 41-Inch Vertical Antenna

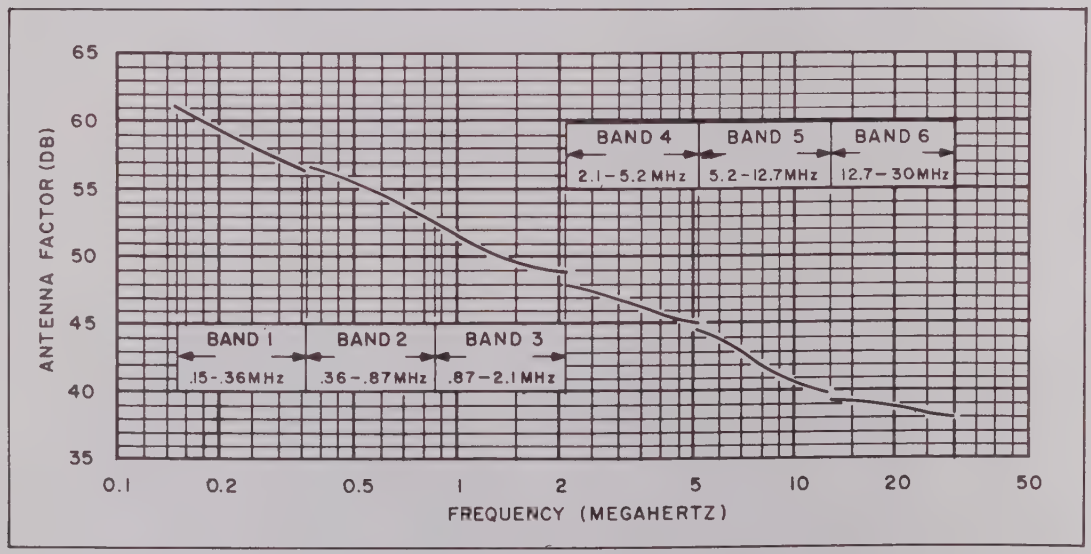


Figure 2-17. Antenna Factor Versus Frequency Characteristics, Model LP-105 12-Inch Loop Antenna

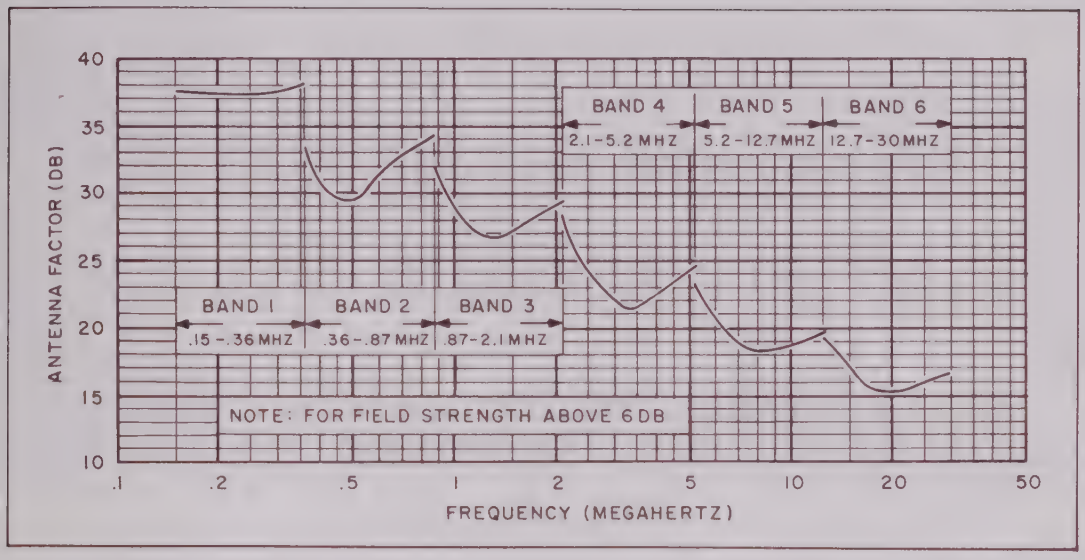


Figure 2-18. Typical Antenna Factor Versus Frequency Characteristics, Model VA-105 41-Inch Telescoping Vertical Antenna

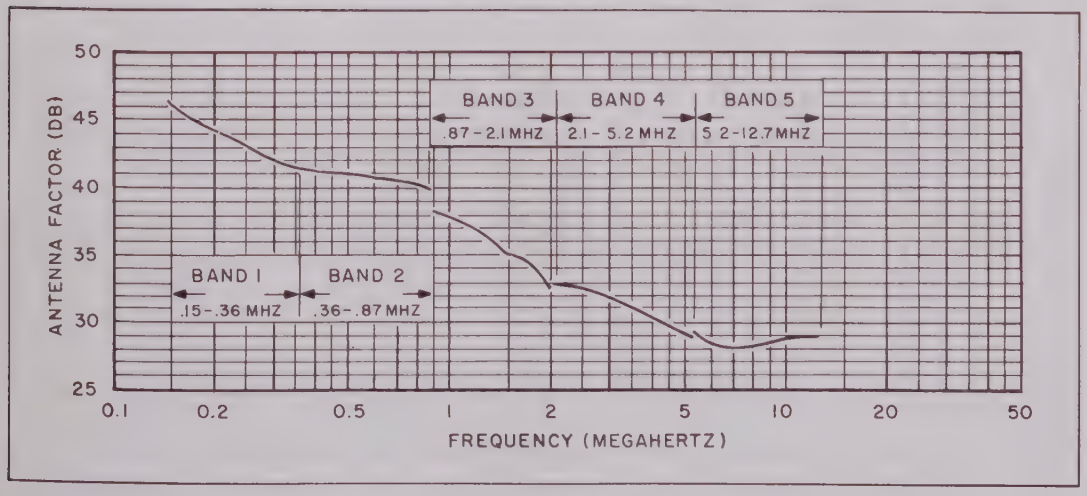


Figure 2-19. Antenna Factor Versus Frequency Characteristics, Model LP-3-105 36-Inch Loop Antenna

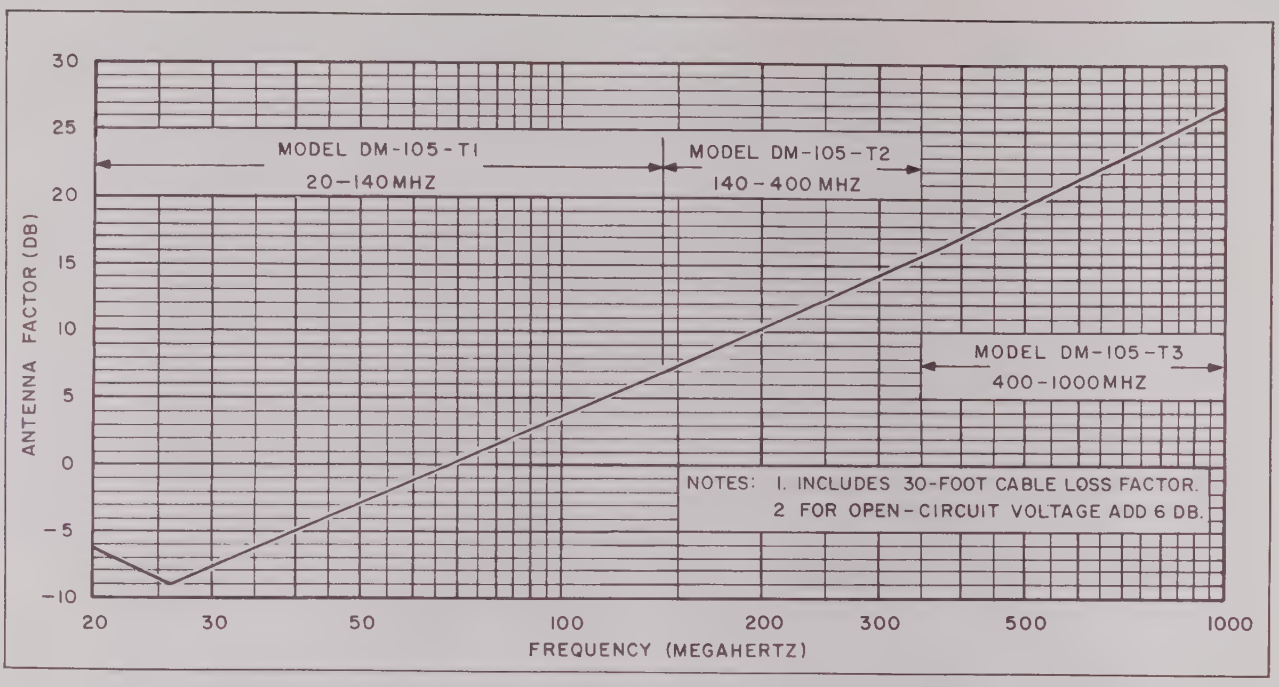


Figure 2-20. Antenna Factor Versus Frequency Characteristics, Models DM-105-T1, DM-105-T2 and DM-105-T3 Dipole Antennas

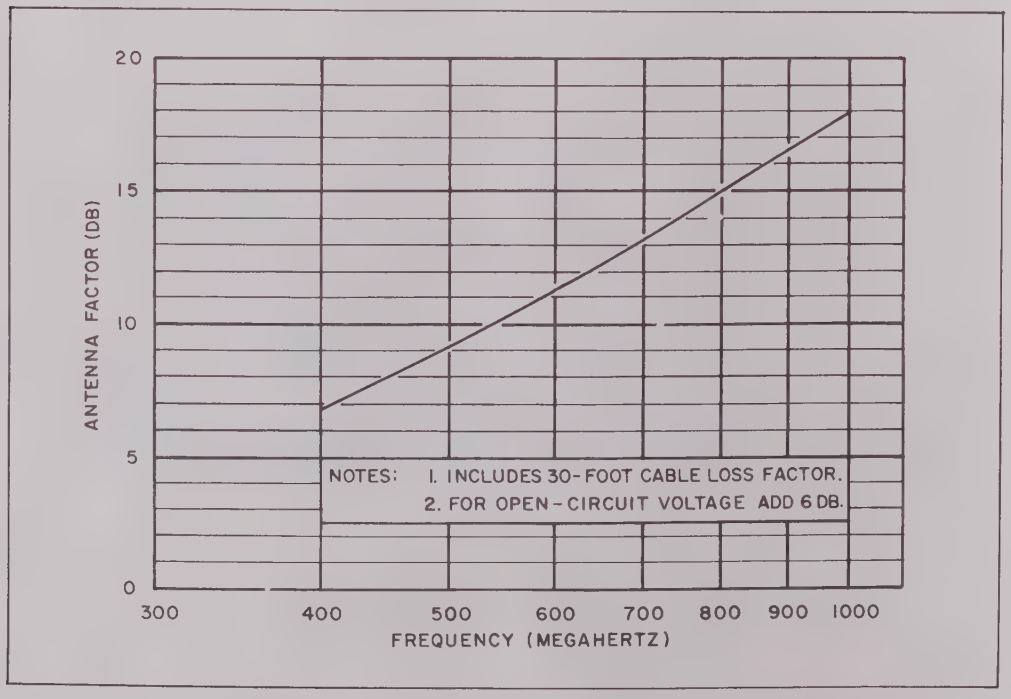


Figure 2-21. Antenna Factor Versus Frequency Characteristics, Model RA-105 Corner Reflector Antenna

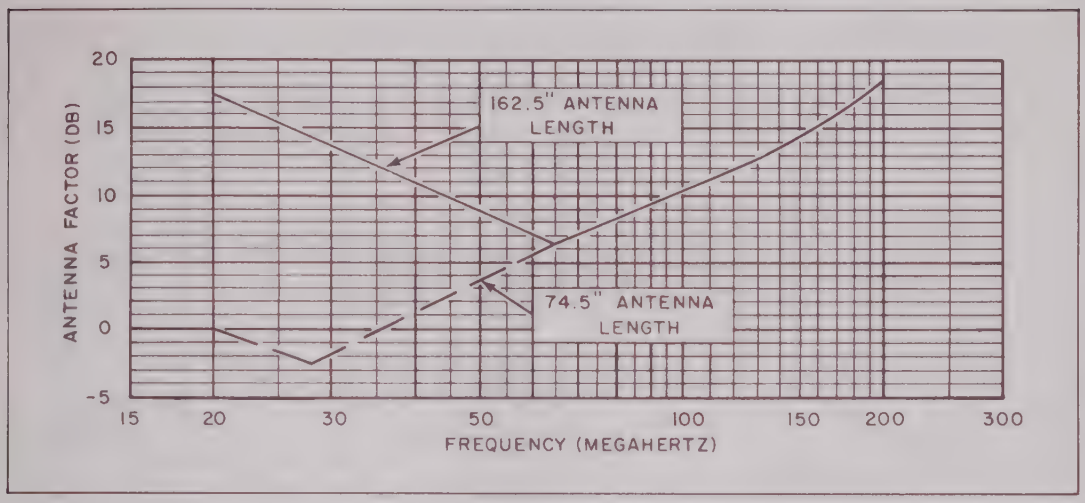


Figure 2-22. Antenna Factor Versus Frequency Characteristics, Model MD-105-T1 Broad Band Dipole Antenna

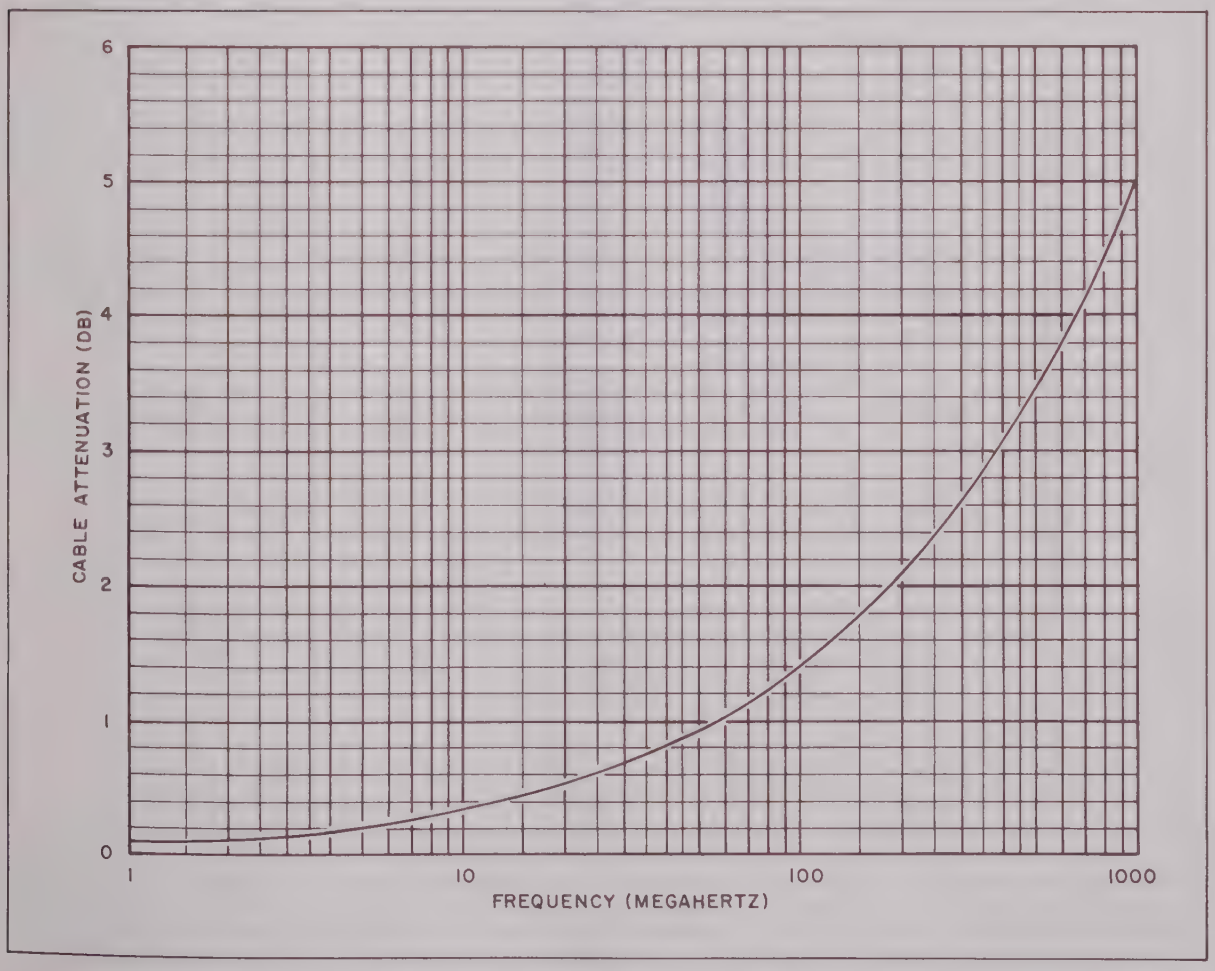


Figure 2-23. Attenuation Versus Frequency Characteristics for 30-Foot Length of RG-55/U Coaxial Cable

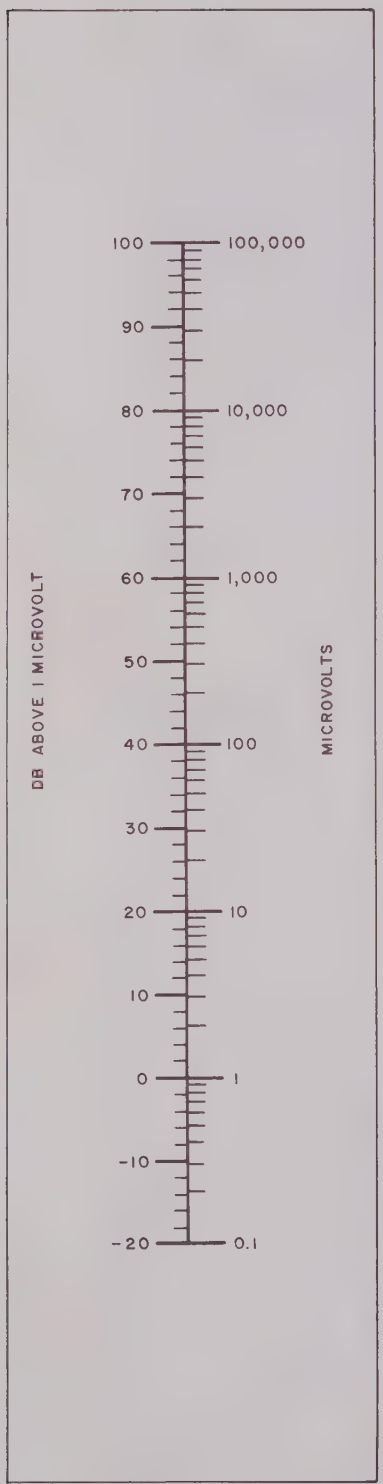


Figure 2-24. Microvolts to dB above 1 Microvolt Conversion Nomograph

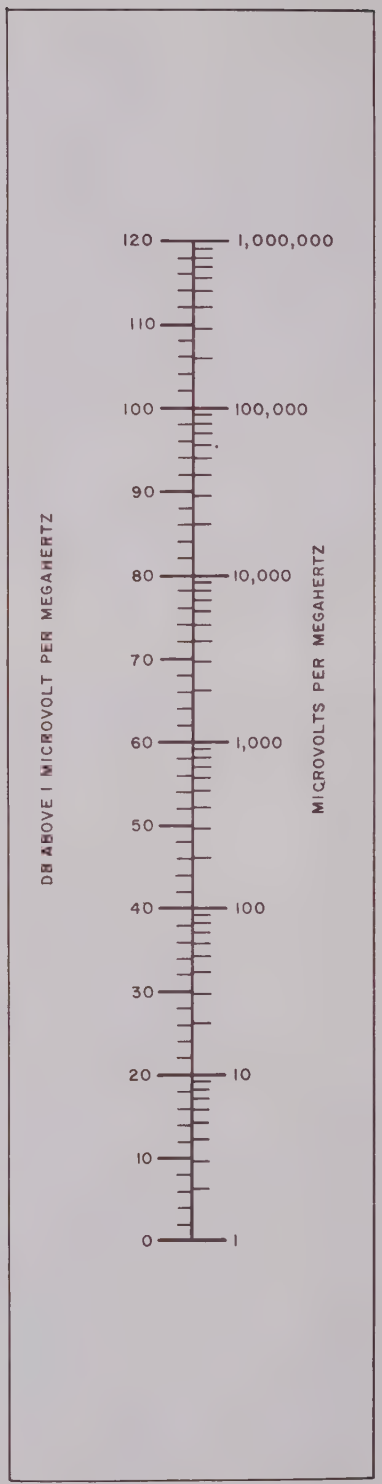


Figure 2-25. Microvolts per Megahertz to dB above 1 μV/MHz Conversion Nomograph

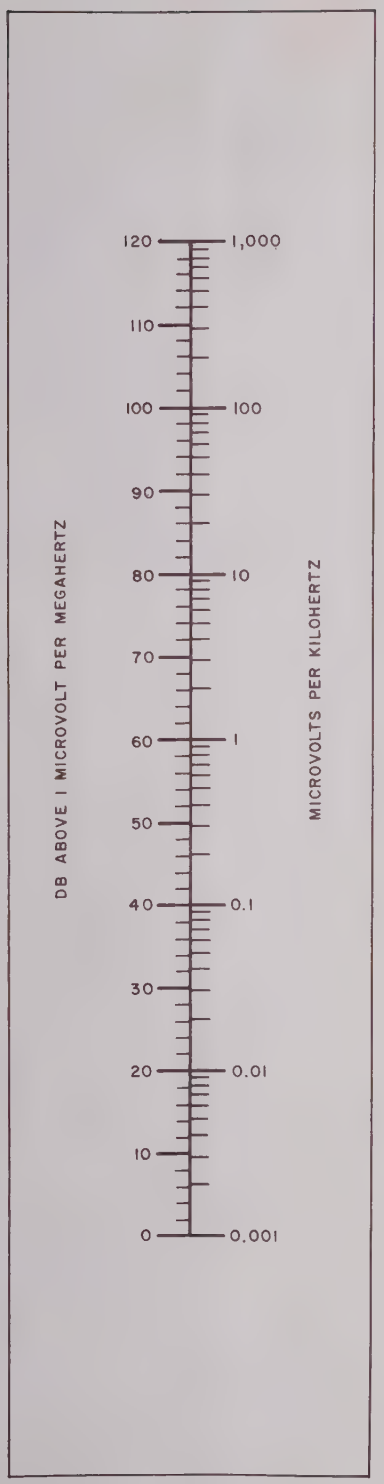


Figure 2-26. Microvolts per Kilohertz to dB above 1 μV/MHz Conversion Nomograph

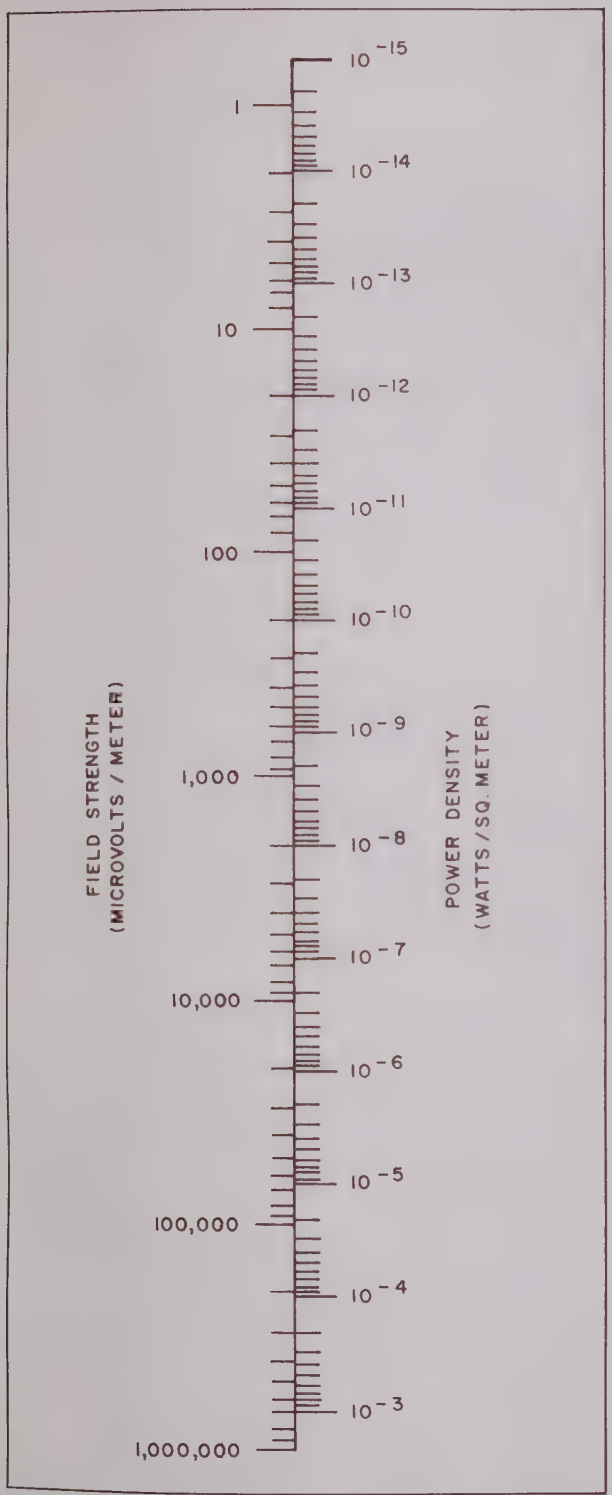


Figure 2-27. Microvolts per Meter to Watts per Square Meter Conversion Nomograph

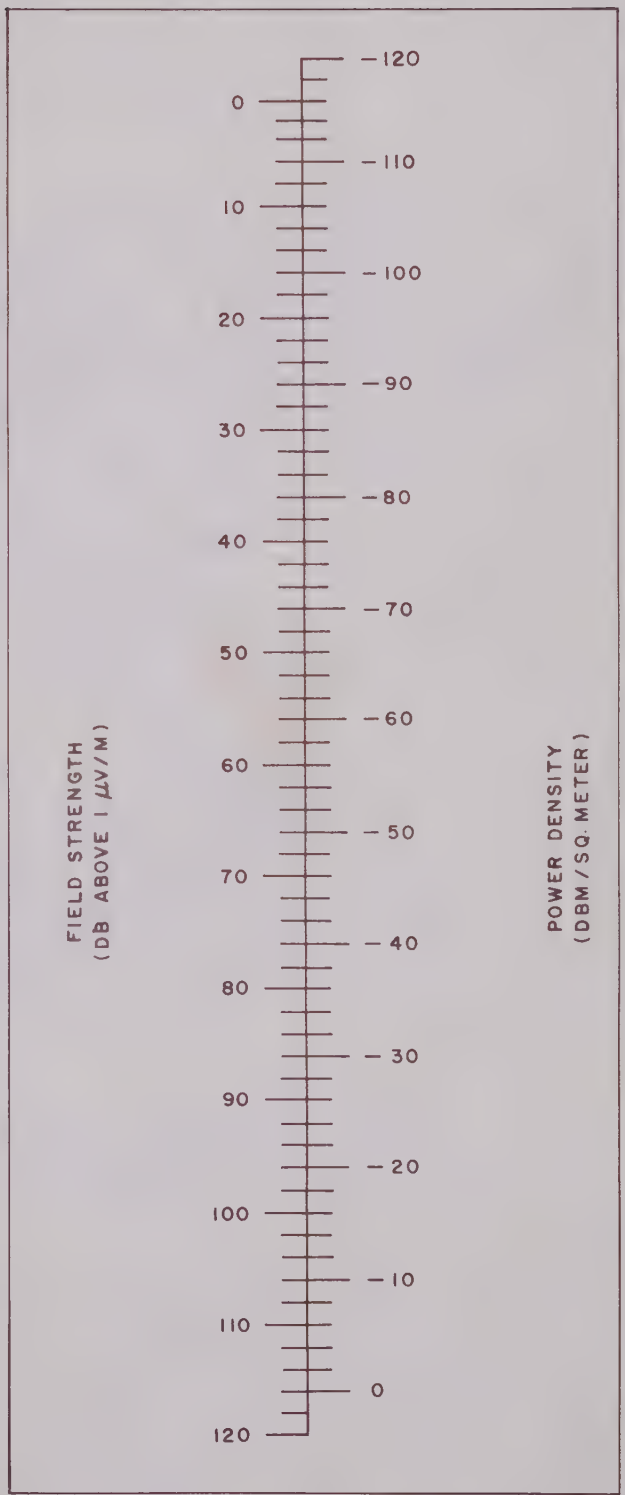


Figure 2-28. dB above 1 Microvolt per Meter to dBm per Square Meter Conversion Nomograph

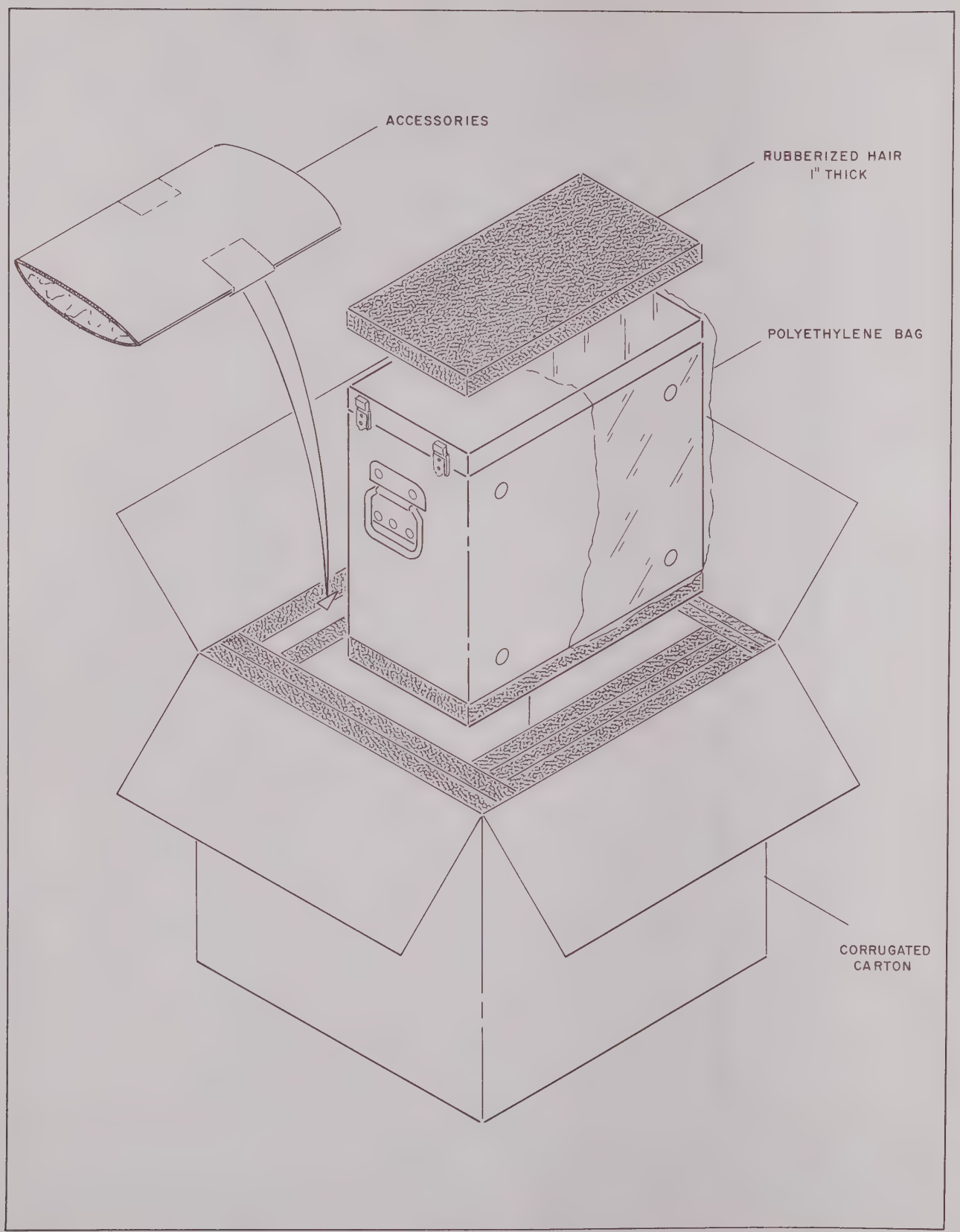


Figure 2-29. Packaging Diagram

SECTION III
THEORY OF OPERATION

3-1. GENERAL.

3-2. The Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters are sensitive, calibrated superheterodyne receivers that measure radiated or conducted noise, noise field intensity, and carrier field intensity in the 14-kHz to 1000-MHz frequency range. The Noise and Field Intensity Meters consist of five plug-in tuning units and a basic unit. Each tuning unit contains r-f and i-f circuits; the Model T-X tuning unit also contains an antenna input tuner, an impulse generator, and a BFO. The basic unit contains: calibrated attenuators; metering, audio, and video circuits; a calibrated standard; and a regulated power supply (paragraph 3-58).

3-3. SIMPLIFIED BLOCK DIAGRAM ANALYSIS. (See Figure 3-1.)

3-4. The r-f signal under measurement is applied through the SIGNAL INPUT connector (50-ohm input impedance) on the basic unit to a calibrated coaxial attenuator (0 to 60 dB, in 20 dB increments). The calibrated coaxial attenuator, which operates in conjunction with the SIGNAL INPUT ATTENUATOR DB switch on the basic unit, inserts sufficient attenuation in the r-f signal path to maintain an on-scale indication on the output meter. The output of the calibrated coaxial attenuator is applied to the particular tuning unit in use.

3-5. Within the tuning unit, the r-f signal is selected, amplified, and converted to an i-f signal. The level of the i-f signal is controlled by operation of the IF GAIN control on the basic unit. The i-f signal output of the tuning unit is then applied to the following circuits on the basic unit: the meter detector, pulse stretcher and VTVM circuits; the audio detector and amplifier circuits; and the video detector and cathode follower circuits. An output is provided at the IF OUT connector of the basic unit for spectrum signature analysis purposes. A pre-IF output signal, whose bandwidth is greater than that of the normal i-f bandpass, is also available. The X-coordinate output, which varies as a linear function of the selected signal, is also obtained from the tuning unit for direct connection to an X-Y Recorder.

3-6. The i-f signal applied to the meter detector, pulse stretcher and VTVM circuits produces an output proportional to the level of the r-f signal under measurement and the type of measurement being performed. In the CARRIER position of the function selector switch, an output proportional to the peak of an unmodulated carrier or average of a modulated carrier is produced by the circuits. In the PEAK position of the switch, the peak value of pulses or a carrier is produced. Prior to making a measurement, the METER BAL., ZERO ADJ. and CARRIER ZERO controls are set for a zero reading on the output meter. With the METER selector switch in the INT position, the resulting signal is applied to the output meter to provide visual indication of the level of the r-f signal under measurement. The meter multiplier is mechanically ganged to the SIGNAL INPUT ATTENUATOR switch to reduce the output meter sensitivity by 20 dB for the 20, 40, 60 and 80 DB positions of the control. This is required because the calibrated coaxial attenuator (paragraph 3-4) inserts only 0, 20, 40, and 60 dB of attenuation in the r-f signal path for the 20, 40, 60, and 80 DB positions, respectively, of the SIGNAL INPUT ATTENUATOR DB switch. When the METER selector switch is in the EXT. position, the resulting signal is applied through the output meter to the EXT. METER RECORDER connector on the basic unit, providing a Y-coordinate output to an external X-Y Recorder.

3-7. The i-f signal applied to the audio detector and amplifier circuits produces an audio signal proportional to the modulation content of the r-f signal under measurement. The audio output signal, whose level is varied by the VOLUME control, is then applied to the PHONES jack for external headset monitoring. When using the aural substitution method of measurement (paragraph 2-34), the SLIDEBACK control is adjusted for a barely audible signal in the headset, permitting the measurement of a pulsed CW signal occuring at a low pulse repetition rate.

3-8. The i-f signal applied to the video detector and cathode follower circuits produces an output at the VIDEO OUTPUT jack for oscilloscope monitoring of the signal modification. The nominal bandwidth of the video output is about 50 percent of the associated tuning unit bandwidth.

3-9. When using Vertical Antenna VX-105 with the T-X tuning unit, the r-f signal under measurement is applied through the VERT. ANT. connector on the T-X tuning unit to an antenna input tuner. The antenna input tuner selects the r-f signal under measurement and matches the high impedance output of the VX-105 antenna to the 50-ohm input impedance of the basic unit. The output of the antenna input tuner is then applied to the SIGNAL INPUT connector on the basic unit.

3-10. The calibration standard in the basic unit consists of an impulse generator which is used when calibrating the T-1, T-2, T-3, and T-A tuning units. Placing the IMPULSE GEN. selector switch to the

ON position energizes the impulse generator, causing its output (flat from 10 kHz to 1000 kHz) to be applied through a calibrated attenuator network to the IMPULSE GEN. connector on the basic unit. The calibrated attenuator network, which operates in conjunction with the IMPULSE GEN. OUTPUT DBMHZ switch on the basic unit and the ADD TO IMPULSE GEN. OUTPUT control and meter, adjusts the output level of the impulse generator from 30 to 97 dB above 1μ V/MHz. During equipment gain calibration, a patch cable is connected between the IMPULSE GEN. and SIGNAL INPUT connectors on the basic unit, allowing the impulse generator output to be applied to the associated tuning units.

3-11. The T-X tuning unit contains its own impulse generator which is energized when the IMPULSE GEN. switch on the tuning unit is placed to the ON position. The output of the generator (flat from 0 to 450 kHz) is applied through a calibrated attenuator network to the IMPULSE GEN. OUTPUT connector on the tuning unit. The calibrated attenuator, which operates in conjunction with the IMPULSE GEN. LEVEL (DBMHz) control on the T-X tuning unit, adjusts the output level of the impulse calibrator from 40 to 110 dB above 1μV/MHz, in 1 dB increments. During gain calibration of the T-X tuning unit, a patch cable is connected between the IMPULSE GEN. OUTPUT connector on the T-X tuning unit and the SIGNAL INPUT connector on the basic unit, allowing the generator output to be applied to the tuning unit.

3-12. Also included in the T-X tuning unit is a BFO which permits listening to unmodulated CW signals. Placing the BFO switch to the ON position energizes the BFO, causing its 225.5-kHz output to heterodyne with the unmodulated 225-kHz i-f output. The difference between these two signals (500 Hz) is then detected and amplified in the basic unit, and the resulting 500-Hz audio tone is applied to the PHONES jack for headset monitoring.

3-13. DETAILED THEORY OF OPERATION, TUNING UNITS. (See Figures 3-2 through 3-6 and 5-4 through 5-12.)

3-14. Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters use five plug-in tuning units: T-X, T-A, T-1, T-2, and T-3. Each of these tuning units is described below.

3-15. T-X TUNING UNIT. (See figures 3-2 and 5-4.) The T-X tuning unit covers the frequency range from 14 to 150 kHz in the following three bands: 14 to 25 kHz, 25 to 62 kHz, and 62 to 150 kHz. The overall bandwidth of the T-X tuning unit is nominally 1 kHz. The tuning unit consists of an antenna input tuner, a 150-kHz low-pass filter, a 14- to 150-kHz tuner, a balanced mixer, a 225-kHz i-f amplifier, an impulse generator, a BFO, and an X-coordinate output network.

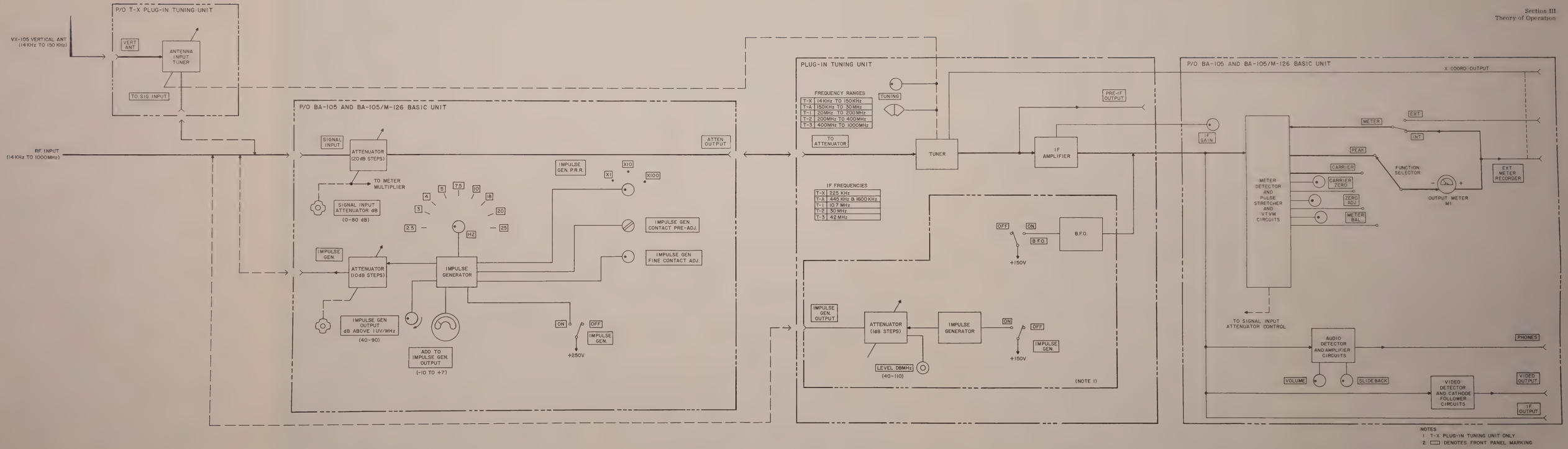
3-16. Antenna Input Tuner. The antenna input tuner consists of section A of variable capacitor C900 and the 14- to 25-kHz, 25- to 62-kHz, and 62- to 150-kHz tuning circuits (C901, C904, and L904; C902 and L903; and C903, C963, and L902, respectively). Capacitor C900A, which is mechanically ganged to the TUNING control, tunes the circuit selected by band selector switch S900 to the r-f signal under measurement. The high impedance output of the VX-105 antenna is matched to the 50-ohm input impedance of the basic unit by matching transformers L902, L903, and L904.

3-17. 150-kHz Low-Pass Filter. The 150-kHz low-pass filter consists of a constant-k T section and m-derived end sections. The T section (L909, L910, and C926) attenuates spurious signals above 150 kHz and the image frequency; the m-derived end sections (L914 and C924; and L915 and C925) eliminate unwanted signals at the i-f frequency (225 kHz) and maintain the input and output impedance of the filter at 50 ohms over its bandpass.

3-18. 14- to 150-kHz Tuner. The 14- to 150-kHz tuner consists of r-f amplifier V901 and local oscillator V902. The 14- to 25-kHz, 25- to 62-kHz, and 62- to 150-kHz tuning circuits (C911, C962, and L911; C912, and L913; and C913, C966 and L912, respectively) at the input of the r-f amplifier reduce the possibility of pulse overload and cross-modulation. Sections B and C of variable capacitor C900 tune the r-f amplifier to the r-f signal under measurement. Stage V902, a Hartley-type oscillator operating 225 kHz above the incoming r-f signal, is tuned by section D of variable capacitor C900.

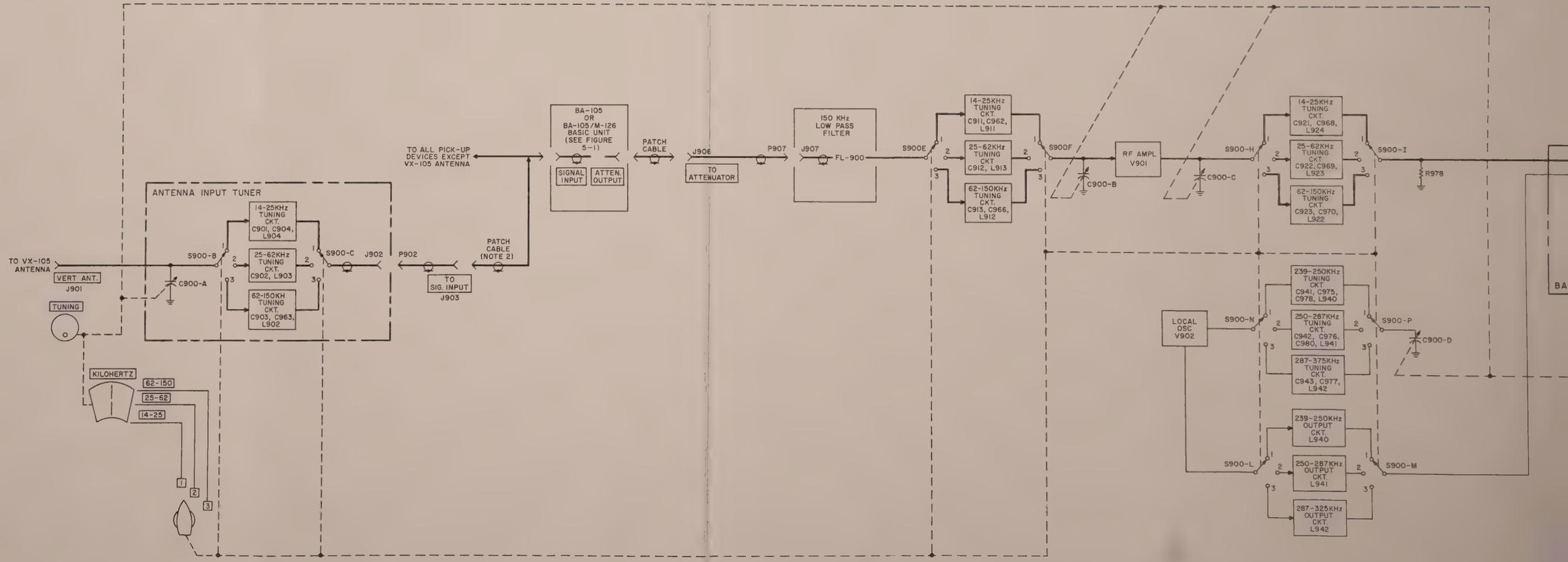
3-19. Balanced Mixer. The balanced mixer is composed of matched diodes CR901 and CR902, and center-tapped transformer L916. When only the local oscillator output is applied to the mixer, no output is obtained across load resistors R948 and R984. However, when both the r-f amplifier output and local oscillator output are applied, the nonlinear characteristics of the mixer produce the sum and difference frequencies of these signals, as well as the r-f signal. The local oscillator signal is effectively eliminated in the mixer output, reducing noise modulation components in the mixer output. Such noise modulation components limit the sensitivity of the T-X tuning unit. The mixer output (sum, difference, and r-f signal) is applied to the 225-kHz i-f amplifier through SIG. ATT. network R949 and R950. The pre-IF output signal is obtained at the junction of resistors R948 and R984 and applied to PRE-IF OUTPUT connector J909.

3-20. 225-kHz I-f amplifier. The 225-kHz i-f amplifier is a four-stage i-f amplifier tuned to the difference frequency portion (225 kHz) of the balanced mixer output. The first three i-f amplifier stages (V903 through V905) employ double-tuned transformers to select the 225-kHz signal; the final i-f amplifier stage (V906) employs a tuned bifilar-wound transformer to select the 225-kHz signal and provide a low-impedance source for the meter detector on the basic unit. A low-impedance source is required for good pulse response. The IF GAIN control on the basic unit controls the gain of the amplifier over approximately a 90 dB range by varying the bias on stages V903 through V905.



NOTES
1 T-X PLUG-IN TUNING UNIT ONLY
2 ▭ DENOTES FRONT PANEL MARKING

Figure 3-1. Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters, Simplified Block Diagram


ANTENNA INPUT TUNER
TO VX-105 ANTENNA
VERT. ANT. J901
TUNING
KILOHERTZ
62-150
25-62
14-25
1
2
3
C900-A
S900-B
14-25KHz TUNING CKT. C901, C904, L904
25-62KHz TUNING CKT. C902, L903
62-150KH TUNING CKT. C903, C963, L902
S900-C
J902
P902
TO SIG. INPUT J903
PATCH CABLE (NOTE 2)
TO ALL PICK-UP DEVICES EXCEPT VX-105 ANTENNA
BA-105 OR BA-105/M-126 BASIC UNIT (SEE FIGURE 5-1)
SIGNAL INPUT
ATTEN. OUTPUT
PATCH CABLE
J906
TO ATTENUATOR
P907
J907
150 KHz LOW PASS FILTER
FL-900
S900-E
14-25KHz TUNING CKT. C911, C962, L911
25-62KHz TUNING CKT. C912, L913
62-150KHz TUNING CKT. C913, C966, L912
S900-F
C900-B
RF AMPL V901
C900-C
S900-H
14-25KHz TUNING CKT. C921, C968, L924
25-62KHz TUNING CKT. C922, C969, L923
62-150KHz TUNING CKT. C923, C970, L922
S900-I
R978
LOCAL OSC V902
S900-N
239-250KHz TUNING CKT. C941, C975, C978, L940
250-287KHz TUNING CKT. C942, C976, C980, L941
287-375KHz TUNING CKT. C943, C977, L942
S900-P
C900-D
239-250KHz OUTPUT CKT. L940
250-287KHz OUTPUT CKT. L941
287-325KHz OUTPUT CKT. L942
S900-L
S900-M

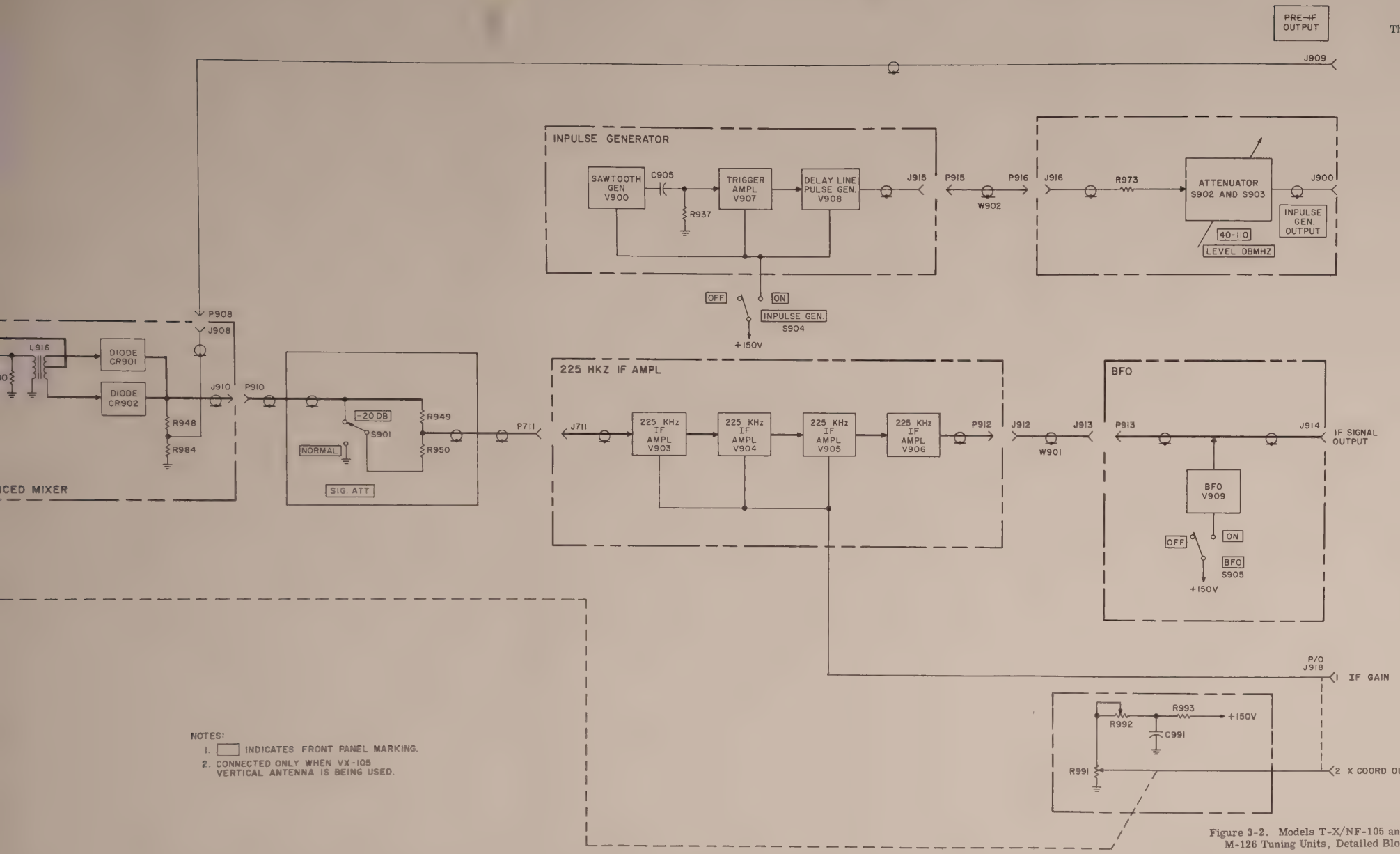


Figure 3-2. Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, Detailed Block Diagram

3-21. Impulse Generator. The impulse generator consists of sawtooth generator V900, trigger amplifier V907, and delay line pulse generator V908. Placing IMPULSE GEN. switch S904 to the ON position energizes the generator, causing sawtooth generator V900 (neon tube relaxation oscillator) to produce a 100-Hz sawtooth output. The sawtooth output is differentiated by capacitor C905 and resistor R937, and the resulting trigger pulses are applied to trigger amplifier V907. The amplified trigger output pulses from V907 are applied to delay line generator V907, which is normally held at cut-off by the negative supply voltage developed by diode CR900 and capacitor C910. Stage V907 then conducts, generating a train of pulses, the width of each pulse being equal to twice the delay of the pulse forming network (L901, L905 through L907, and C915 through C918) within stage V907. The fourier transform of the pulse train has a spectral intensity of uniform amplitude from 0 to 450 kHz. The output of the impulse generator is adjustable from 40 to 100 dB above 1μV/MHz (in 1 dB increments) by LEVEL DBMHz switches S902 and S903.

3-22. Bfo. Stage V909, a Hartley-type oscillator operating at 225.5 kHz, is energized when BFO switch S905 is placed to the ON position. When energized, its 225.5 kHz output beats with the unmodulated 225-kHz i-f signal to produce a 500-Hz tone in the headset.

3-23. X-Coordinate Output Network. Resistors R991 through R993 comprise a voltage divider network that produces a d-c voltage (0 to 10V) which varies as a function of the tuning dial position. The d-c voltage (X-coordinate output) is obtained from the wiper arm of multi-turn linear precision potentiometer R991, which is mechanically ganged to the TUNING control. Capacitor C991 eliminates transients in the network.

3-24. T-A TUNING UNIT. (See figures 3-3, 5-5, and 5-6.) The T-A tuning unit covers the frequency range from 150 kHz to 30 MHz in the following six bands: 150 kHz to 360 kHz, 360 kHz to 870 kHz, 870 kHz to 2.1 MHz, 2.1 MHz to 5.2 MHz, 5.2 MHz to 12.5 MHz, and 12.5 MHz to 30 MHz. The overall bandwidth of the T-A tuning unit is nominally 10 kHz. The tuning unit consists of a low-pass filter, a 150-kHz to 30-MHz turret tuner, 455-kHz and 1600-kHz i-f amplifiers, and an X-coordinate output network.

3-25. Low-Pass Filter. Low-pass filter FL-701 consists of three constant-k T sections and m-derived end sections. The low-pass filter in the T-A/NF-105 tuning unit also includes a 6 dB pi-section resistive attenuator pad to keep the input VSWR at a low value. The T sections (L712 through L715 and C830 through C834) attenuate spurious signals above 30 MHz; the m-derived end sections (L716 and C822; and L717 and C838) maintain the input and output impedance of the filter at 50 ohms over its bandpass. Higher sensitivity is obtained in the T-A/NF-105/M-126 tuning unit by removal of the 6 dB pad (R701, R702, and R717).

3-26. 150-kHz to 30-MHz Turret Tuner. The 150-kHz to 30-MHz turret tuner consists of r-f amplifier V700, mixer V701 and local oscillator V702. The grid circuit of stage V700 is tuned to the r-f signal under measurement, reducing the possibility of pulse overload and cross-modulation. A 1600-kHz r-f trap is employed in the cathode circuit of V700 in tuning bands 2, 4, 5 and 6 to eliminate unwanted signals at the i-f frequency. In tuning band 1 (150 kHz to 360 kHz), the 1600-kHz trap has no effect since the 455-kHz i-f amplifier is used in this band. In band 3 (870 kHz to 2100 kHz) the trap is shorted to ground to allow tuning to a 1600-kHz signal. Stage V701, a pentode suppressor-grid-modulated mixer, has its grid circuit tuned to the r-f signal under measurement and its plate circuit tuned to the i-f frequency. Stage V702 is an Armstrong tickler feedback oscillator that operates either 455 kHz (bands 1 and 3) or 1600 kHz (bands 2, 4, 5 and 6) above the incoming r-f signal. Continuous tuning of stages V700, V701, and V702 is performed by sections A through C of variable capacitor C712, which is mechanically ganged to the TUNING control.

3-27. The mixer output is applied through switch assembly S701 to either the 455-kHz or 1600-kHz i-f amplifier. The proper i-f amplifier is automatically selected by the band-switching turret. The pre-IF Output signal is obtained at the output of V701 and applied through cathode follower V711 to PRE-I.F. OUTPUT connector J709.

3-28. 455-kHz and 1600-kHz I-f Amplifiers. The 455-kHz and 1600-kHz i-f amplifiers are four-stage i-f amplifiers tuned to the difference frequency portion of the mixer output. The first three stages of the 455-kHz and 1600-kHz i-f amplifiers (V707 through V709 and V703 through V705, respectively) employ double-tuned transformers to select the i-f signal; the final stage of the 455-kHz and 1600-kHz i-f amplifiers (V710 and V706, respectively) employs a single-tuned transformer to select the i-f signal and provide a low-impedance source for the meter detector on the basic unit. Resistors are connected in parallel with the double-tuned transformers to broaden the bandwidth of the amplifiers. As previously mentioned, the 455-kHz i-f amplifier is automatically selected by the bandswitching turret in tuning bands 1 and 3, and the 1600-kHz i-f amplifier is automatically selected in bands 2, 4, 5 and 6. The IF GAIN control on the basic unit controls the gain of the 455-kHz and 1600-kHz i-f amplifiers over approximately a 57 dB range by varying the bias on stages V707 and V708, and V703 thru V705, respectively.

3-29. X-Coordinate Output Network. The X-coordinate output network on the T-A tuning unit comprises resistors R271 through R273, and capacitor C857. This network operates identically to the corresponding network on the T-X tuning unit (paragraph 3-23).

3-30. T-1 TUNING UNIT. (See figures 3-4, 5-7, and 5-8.) The T-1 tuning unit covers the frequency range from 20 MHz to 200 MHz in the following two bands: 20 to 65 MHz, and 65 to 200 MHz. The overall bandwidth of the T-1/NF-105 and T-1/NF-105/M-126 tuning units is nominally 125 kHz and 3 kHz,

respectively. The tuning unit consists of two low-pass filters, the 20- to 65-MHz and 65- to 200-MHz tuners, a 10.7-MHz i-f amplifier, and an X-coordinate output network. A 6 dB T-section resistive attenuator pad (AT1) is also included in the T-1/NF-105 tuning unit to keep the input VSWR at a low value.

3-31. Low-Pass Filters. The low-pass filters (FL1-A and FL1-B) consist of three constant-k T-sections and m-derived end sections. The T-sections of filters FL1-A and FL1-B attenuate spurious signals above 65 MHz and 200 MHz, respectively; the m-derived end sections of the filters maintain the input and output impedance of each filter at 50 ohms over its bandpass.

3-32. 20- to 65-MHz and 65- to 200-MHz Tuners. The 20- to 65-MHz tuner consists of r-f amplifiers V8 and V9, mixer V10A, and local oscillator V10B; the 65- to 200-MHz tuner consists of r-f amplifiers V11 and V12, mixer V13A, and local oscillator V13B. The grid circuit of stages V8 and V11 are tuned to the r-f signal under measurement to reduce the possibility of pulse overload and cross-modulation. Stages V10A and V13A are pentode mixers which have their grid circuit tuned to the r-f signal under measurement and their plate circuits tuned to the i-f signal (10.7 MHz). Local oscillators V10B and V13B are Colpitts-type oscillators operating 10.7 MHz above the incoming r-f signal. On the T-1/NF-105/M-126 tuning unit, fine tuning of the oscillators is provided by FINE TUNING control R52. Continuous tuning of the 20- to 65-MHz and 65- to 200-MHz tuners is performed by variable inductors L19, L21, L23, and L25; and L32, and L35, L38 and L41, respectively, which are mechanically ganged to the TUNING control. The proper tuner is selected by switches S2 and S1, which are mechanically ganged to the FREQUENCY RANGE control.

3-33. 10.7-MHz I-f Amplifier. The 10.7-MHz i-f amplifier of the T-1/NF-105 tuning unit consists of three i-f amplifier stages (V14 through V16) and an i-f driver stage (V17); the T-1/NF-105/M-126 tuning unit includes these stages plus a 10.7-MHz narrow band (3 kHz) crystal filter and an additional i-f amplifier stage (V40). Higher sensitivity and selectivity are obtained in the T-1/NF-105/M-126 tuning unit by the addition of the crystal filter and i-f amplifier stage and the removal of attenuator AT1. The i-f amplifier stages are tuned pentode amplifiers. Driver stage V17 is a cathode follower that provides a low-impedance source for the meter detector on the basic unit. Variable inductor L47 tunes the cathode circuit of V17 to 10.7 MHz, obtaining a maximum output voltage from V17. The IF GAIN control on the basic unit controls the gain of the 10.7 MHz i-f amplifier over approximately a range of 63 dB and 75 dB by varying the bias of stages V14 through V16 on the T-1/NF-105 tuning unit, and stages V14 through V16 and V40 on the T-1/NF-105/M-126 tuning unit, respectively. The pre-IF Output signal is obtained at the junction of resistors R286 and R287 and applied to PRE-I. F. OUTPUT connector J9.

3-34. X-Coordinate Output Network. The X-coordinate output network on the T-1 tuning unit comprises resistors R282 through R284 and capacitor C226. This network operates identically to the corresponding network on the T-X tuning unit (paragraph 3-23).

3-35. T-2 TUNING UNIT (See figures 3-5, 5-9, and 5-10). The T-2 tuning unit covers the frequency range from 200 to 400 MHz in one continuously tunable band. The overall bandwidth of the T-2/NF-105 and T-2/NF-105/M-126 tuning units is nominally 225 kHz and 3 kHz, respectively. The tuning unit consists of a low-pass filter, a 200- to 400-MHz tuner, a 30-MHz i-f amplifier, and an X-coordinate output network.

3-36. Low-Pass Filter. Low-pass filter FL-2 consists of three constant-k T-sections and m-derived end sections. The low-pass filter in the T-2/NF-105 tuning unit also includes a 6 dB T-section resistive attenuator pad to keep the input VSWR at a low value. The T-sections (L202 through L205 and C202 through C204) attenuate spurious signals above 400 MHz; the m-derived end sections (L201 and C201; and L206 and C205) maintain the input and output impedance of the filter at 50 ohms over its bandpass. Higher sensitivity is obtained in the T-2/NF-105/M-126 tuning unit by removal of the 6 dB pad (R201 through R203).

3-37. 200- to 400-MHz Tuner. The 200- to 400-MHz tuner consists of r-f amplifier V1, crystal mixer CR1, and local oscillator V2. The input circuit of stage V1, a grounded-grid amplifier, is tuned to the r-f signal under measurement to reduce the possibility of pulse overload and cross-modulation. Crystal mixer CR1 is inductively coupled to r-f amplifier V1 and local oscillator V2 through untuned inductor L4. Stage V2 is a Colpitts-type operating 30 MHz above the incoming r-f signal. On the T-2/NF-105/M-126 tuning unit, fine tuning of the local oscillator is provided by FINE TUNING control R282. Continuous tuning of stages V1 and V2 is performed by variable capacitors C3, C5, and C11, which are mechanically ganged to the TUNING control. The pre-IF Output signal is obtained at the junction of resistors R272 and R274 and applied to PRE-I. F. OUTPUT connector J208.

3-38. 30-MHz I-f Amplifier. The 30-MHz i-f amplifier of the T-2/NF-105 tuning unit consist of four i-f amplifier stages (V3 through V6) and an i-f driver stage (V7); the T-2/NF-105/M-126 includes these stages plus a 30-MHz narrow band (3 kHz) crystal filter and an additional i-f amplifier stage (V900). Higher sensitivity and selectivity are obtained in the T-2/NF-105/M-126 tuning unit by the addition of the crystal filter and i-f amplifier stage, and the removal of the 6 dB pad from filter FL-2. An improvement in noise figure is obtained in the T-2/NF-105/M-126 tuning unit by using a cascode amplifier for stage V3 instead of the pentode i-f amplifier used on the T-2/NF-105 tuning unit. Driver stage V7 is a cathode follower that provides low-impedance source for the meter detector on the basic unit. Variable inductor L16 tunes the cathode

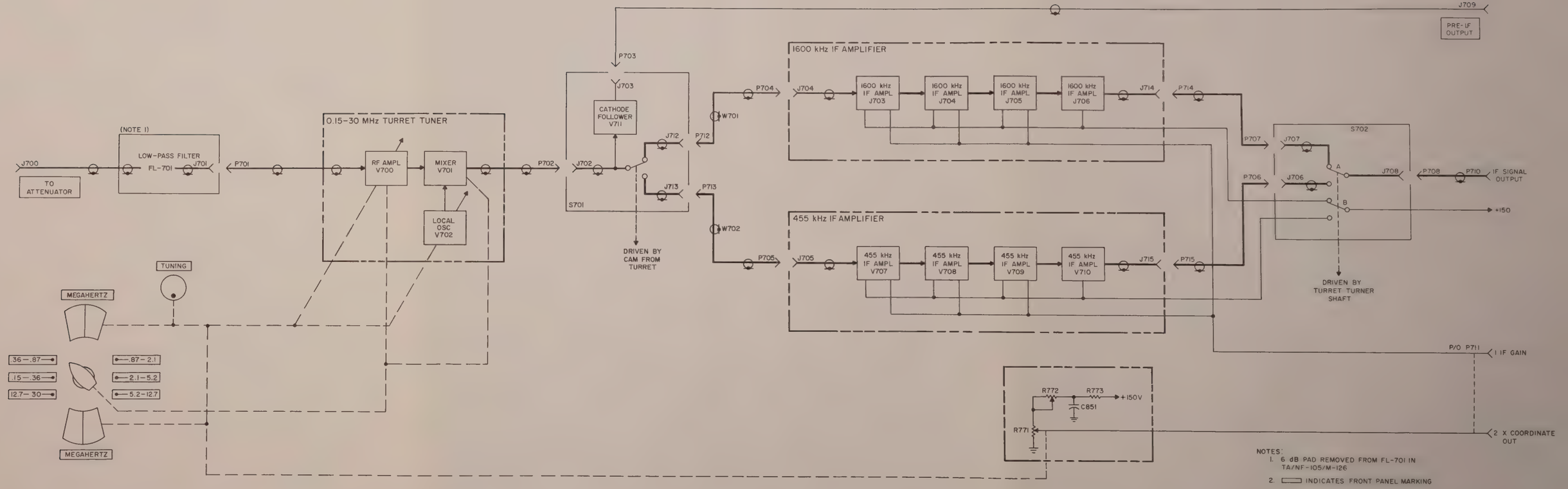
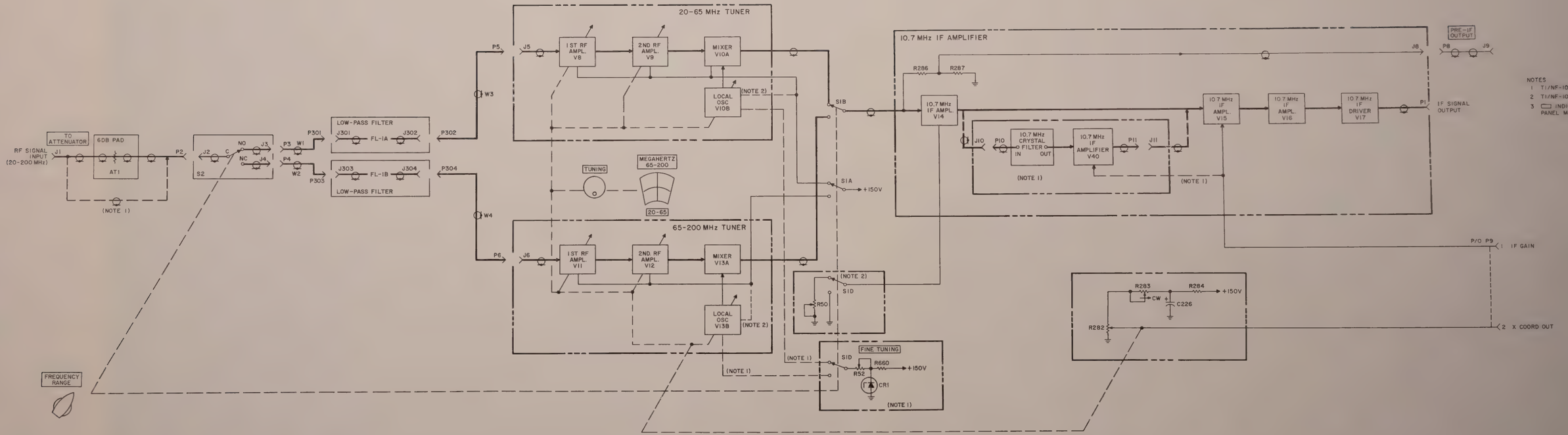


Figure 3-3. Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, Detailed Block Diagram



NOTES
1 T1/NF-105/M-126 ONLY
2 T1/NF-105 ONLY
3 ▭ INDICATES FRONT PANEL MARKING

Figure 3-4. Models T-1/NF-105 and T-1/NF-105/M-126 Tuning Units, Detailed Block Diagram

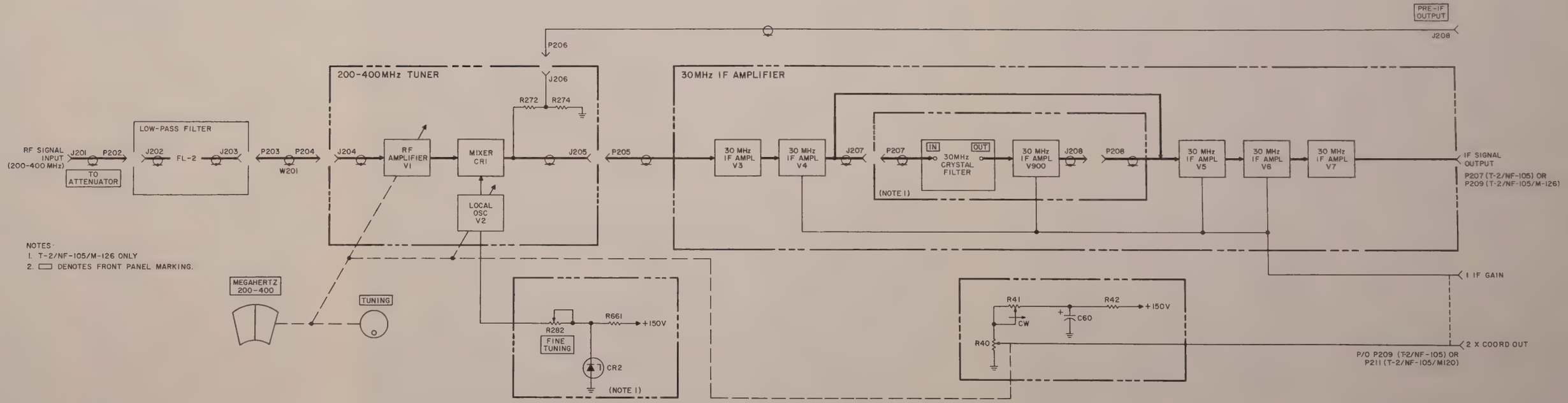


Figure 3-5. Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units, Detailed Block Diagram

circuit of V7 to 30 MHz, obtaining a maximum output voltage from V7. The IF GAIN control on the basic unit controls the gain of the 30-MHz i-f amplifier over approximately a 74 dB and 100 dB range by varying the bias on stages V4 through V6 on the T-2/NF-105 tuning unit, and stages V4 through V6 and V900 on the T-2/NF-105/M-126 tuning unit, respectively.

3-39. X-Coordinate Output Network. The X-coordinate output network on the T-2 tuning unit comprises resistors R40 through R42 and capacitor C60. This network operates identically to the corresponding network on the T-X tuning unit (paragraph 3-23).

3-40. T-3 TUNING UNIT. (See figures 3-6, 5-11, and 5-12.) The T-3 tuning unit covers the frequency range from 400 MHz to 1000 MHz in the following two bands: 400 to 700 MHz, and 700 to 1000 MHz. The overall bandwidth of the T-3/NF-105 and T-3/NF-105/M-126 tuning units is nominally 400 kHz and 6 kHz, respectively. The tuning unit consists of a low-pass filter (T-3/NF-105 only), the 400- to 700-MHz and 700- to 1000-MHz tuners, a 42-MHz i-f amplifier, and an X-coordinate output network.

3-41. Low-Pass Filter. Coaxial low-pass filter FL-601 is a distributed constants filter that attenuates spurious signals above 1000 MHz, and keeps the input VSWR at a low level. The input and output impedance of the filter is 50 ohms. The filter has approximately a 0.5 to 0.9 dB loss over its bandpass.

3-42. 400- To 700-MHz and 700- To 1000-MHz Tuners. The 400- to 700-MHz tuner consists of r-f amplifier V603, crystal mixer CR602, and local oscillator V604; the 700- to 1000-MHz tuner consists of r-f amplifier V601, crystal mixer CR601, and local oscillator V602. Stages V601 and V603 are grounded-grid amplifiers with capacitance-loaded, quarter-wave coaxial line tuning circuits in their cathode and plate circuits. Tuning the input circuit of stages V601 and V603 to the r-f signal under measurement reduces the possibility of pulse overload and cross-modulation. Crystal mixers CR601 and CR602 are inductively coupled to their respective r-f amplifier and local oscillator through untuned inductors. Stages V602 and V604 are Colpitt-type oscillators operating 42 MHz above the incoming r-f signal. Capacitance-loaded, quarter-wave tuning circuits are employed in the local oscillators. On the T-3/NF-105/M-126 tuning unit, fine tuning of the oscillators is performed by FINE TUNING control R614. Continuous tuning of stages V601 through V604 is performed by section A through D of variable capacitors C605 and C699, which are mechanically ganged to the TUNING control. The proper tuner is selected by switches S603 and S601, which are mechanically ganged to the FREQUENCY RANGE control.

3-43. 42-MHz I-f Amplifier. The 42-MHz i-f amplifier of the T-3/NF-105 tuning unit consists of four synchronously tuned i-f amplifier stages (V605 through V609) and an i-f driver stage (V610); the T-3/NF-105/M-126 tuning unit includes these stages plus a 42-MHz narrow band (6 kHz) crystal filter and an additional i-f amplifier stage (V611). Higher sensitivity and selectivity are obtained in the T-3/NF-105/M-126 tuning unit by the addition of the crystal filter and i-f amplifier stage, and the removal of low-pass filter FL-601. The first stage of the i-f amplifier employs a cascode amplifier circuit to provide a low noise figure. Driver stage V610 is a cathode follower that provides a low-impedance source for the meter detector on the basic unit. Variable inductor L628 tunes the cathode circuit of V610 to 42 MHz, obtaining a maximum output voltage from V610. The IF GAIN control on the basic unit controls the gain of the 42 MHz i-f amplifier over approximately a 100 dB and 110 dB range by varying the bias on stages V606 through V608 on the T-3/NF-105 tuning unit, and stages V606 through V608 and V611 on the T-3/NF-105/M-126 tuning unit, respectively. The pre-IF Output signal is obtained at the junction of resistors R657 and R663 and applied to PRE-I. F. OUTPUT connector J613.

3-44. X-Coordinate Output Network. The X-coordinate output network on the T-3 tuning unit comprises resistors R660 through R662, and capacitor C702. This network operates identically to the corresponding network on T-X tuning unit (paragraph 3-23).

3-45. DETAILED THEORY OF OPERATION, BASIC UNIT. (See Figures 3-7 and 5-1 through 5-3.)

3-46. The basic unit contains the circuitry required for the detection and metering of the tuning unit output. The basic unit also includes: the circuitry necessary for headset and oscilloscope monitoring of the tuning unit output; the impulse generator which generates impulsive broadband signals for gain calibration of the T-A, T-1, T-2, and T-3 tuning unit; and calibrated step attenuators. Paragraphs 3-47 through 3-57 describe the basic unit circuits.

3-47. METER DETECTOR, PULSE STRETCHER AND VTVM. (See figures 3-7, 5-2, and 5-3.) The meter detector, pulse stretcher and VTVM circuits consist of stages V18 and V21, respectively, on the basic unit. Meter detector V18 operates in conjunction with Function Selector switch S2 to provide a peak value of pulses or carriers in the PEAK position of the switch; and a peak value of unmodulated carriers in the CARRIER position of the switch. The detector has a short charge time and long discharge time for the PEAK position of the function selector switch, and both a short charge time and discharge time for the CARRIER position of the switch. Stage V18 employs a low-impedance dual-section diode which is fed from the low-impedance source in the output of each tuning unit. Thus, the charge time of the output circuit of stage V18 (C151 through C153 and R72 and R74) is extremely short in both the PEAK and CARRIER positions of the function selector switch. When in the PEAK position of the function selector switch, the discharge time is extremely long by virtue of the 50-meghom resistor (R86) in the grid circuit of one half of stage V21. When in the CARRIER position of the switch, the discharge time is shortened by shunting the 50-megohm resistor with approximately 150,000 ohms (R71 and R73).

3-48. Pulse stretcher and VTVM stage V21 employs a difference amplifier with negative feedback to stretch the output of meter detector V18, and to drive output meter M1 to provide a visual indication of the levels of applied r-f signals. For the 0 to 10 microvolt range of the output meter (0 position of SIGNAL INPUT ATTENUATOR DB switch), 2.5 volts is applied to stage V21 to obtain a full-scale meter reading; 25 volts is applied to V21 to obtain a full-scale reading on the higher ranges. The sensitivity of the output meter is switched by switch S3, which is mechanically ganged to the SIGNAL INPUT ATTENUATOR control. Since the r-f and i-f amplifiers in the tuning unit are operated at the same level for all ranges, the residual noise indication on the output meter is reduced by a factor of 10 when operating on the higher ranges. SUBTRACT 10 DB switch S4 is a momentary control that, when actuated, shorts out part of the meter multiplier resistance, thus increasing the meter sensitivity by 10 dB. This feature effectively produces a 10 dB scale overlap on all sensitivity ranges, except the 0 to 10 microvolt range. When using the T-A and T-1 tuning units, the meter sensitivity is increased by shunting resistor R95 with a short and 220 ohms, respectively (via pins 14 and 15 of J16). This increased meter sensitivity is required to reduce the residual noise on the 0 to 10 microvolt range of the output meter, when using the T-A and T-1 tuning units. The shunts improve the low-range linearity of the output meter and make the two-terminal reading of these tuning units equal to the other tuning units.

3-49. Certain preliminary adjustments are necessary in the VTVM circuit in order to allow for variations in tubes, aging, and warmup. Function selector switch S2 disables those circuits which would interfere with these adjustments. When in the METER BAL. position of the Function Selector switch, the control grids (pins 2 and 7) of stage V21 are shorted to ground, allowing METER BAL. control R90 to compensate for differences in the two tube sections. When in the ZERO ADJ. position of the Function Selector switch, the i-f amplifier in the tuning unit is biased to cutoff, allowing ZERO ADJ. control R99 to balance out the contact potential generated in the meter detector for the PEAK position of the Function Selector Switch. The contact potential is balanced out by CARRIER ZERO control R101 for the CARRIER position of the Function Selector switch.

3-50. Output meter M1 has a 1 milliampere and 100 microampere full-scale movement on the BA-105 and BA-105/M-126, respectively; one calibration serves the 0 to 10 microvolt range of the meter and the second calibration serves the higher ranges. This is necessary because of the lack of linearity in the meter detector for voltages below 2.5 volts. The meter movement is protected from overload by crystal diode CR2. The diode limits the dynamic range of the i-f amplifier to a safe value for the less sensitive range. On the BA-105/M-126, the output meter is made more sensitive by placing switch S4 to the M-126 position, thereby removing the meter shunt resistance.

3-51. AUDIO DETECTOR AND AMPLIFIER. (See figures 3-7, 5-2, and 5-3.) The audio detector and amplifier circuits consist of stages V19A and V20, respectively, on the basic unit. Audio detector V19A employs 1/2 secion of a type 12AT7 dual-triode (connected as a diode) to detect the amplitude modulation content of the applied i-f signal. Setting Function Selector switch S2 to the PEAK position permits clearer aural pulse reception and measurement of pulse amplitude by the slideback method of measurement (paragraph 2-34). The PEAK position of the switch allows a d-c bucking voltage (0 to 20 V) from the wiper arm of SLIDEBACK control R80 to be applied to the audio detector. The level of the bucking voltage is adjusted to that value which back-biases the audio detector so that a barely audible signal is heard in the headset. The d-c bucking voltage necessary to obtain a barely audible signal in the headset is equal to the peak value of the amplitude modulation content of the applied i-f signal.

3-52. Audio amplifier V20 employs a type 12AU7 dual-triode for two stages of audio amplification. Audio transformer T10 matches the output of stage V20 to the 600-ohm impedance of the external headset. Filter FL3 is used to prevent r-f interference from reaching the headset and to prevent any r-f signals flowing in the phone leads from coupling back to the input circuit. The level of audio heard in the headset is adjusted by VOLUME control R81.

3-53. VIDEO DETECTOR AND CATHODE FOLLOWER. (See figures 3-7, 5-2, and 5-3.) The video detector and cathode follower circuits consist of diode CR4 and stage V19B, respectively, on the basic unit. Diode CR4 rectifies the modulated i-f signal from the basic unit. The r-f component of the rectified signal is filtered by resistors R280 through R282 and C230. Capacitor C231 is also included in the filter circuit for the lower i-f signals of the T-A and T-X Tuning Units; it is disconnected from the filter circuit for the higher i-f signals of the T-1 through T-3 Tuning Units by microswitch S9. Switch S9 is automatically actuated whenever a T-1, T-2, or T-3 Tuning Unit is plugged into the basic unit. Cathode follower V19B serves as impedance matching device for an external 3000-ohm(or greater) load.

3-54. IMPULSE GENERATOR. (See figures 3-7 and 5-1.) The impulse generator consists of repetition rate generator V23, cathode follower V25, an impulser, and 10-second multivibrator V24. The repetition rate generator is an astable multivibrator whose frequency is adjustable from 2.5 to 2500 Hz by IMPULSE GEN. P.R.R. selector switch S5 and HZ dual-potentiometers R122A and R122B. The square-wave output of the repetition rate generator is applied to cathode follower V25, which employs a type 12AU7 dual-triode to drive the vibrator within the impulser.

3-55. The impulser is essentially an open-ended charged transmission line which is shorted, by means of vibrator (L58), into a 50-ohm coaxial line. The line charging voltage is varied over a 10 dB range by ADD TO IMPULSE GEN. OUTPUT control R163. The periodic discharging of the open-ended transmission line into 50-ohm coaxial output line results in the generation of a train of pulses, the width of each pulse (0.0005 microseconds) being equal to twice the

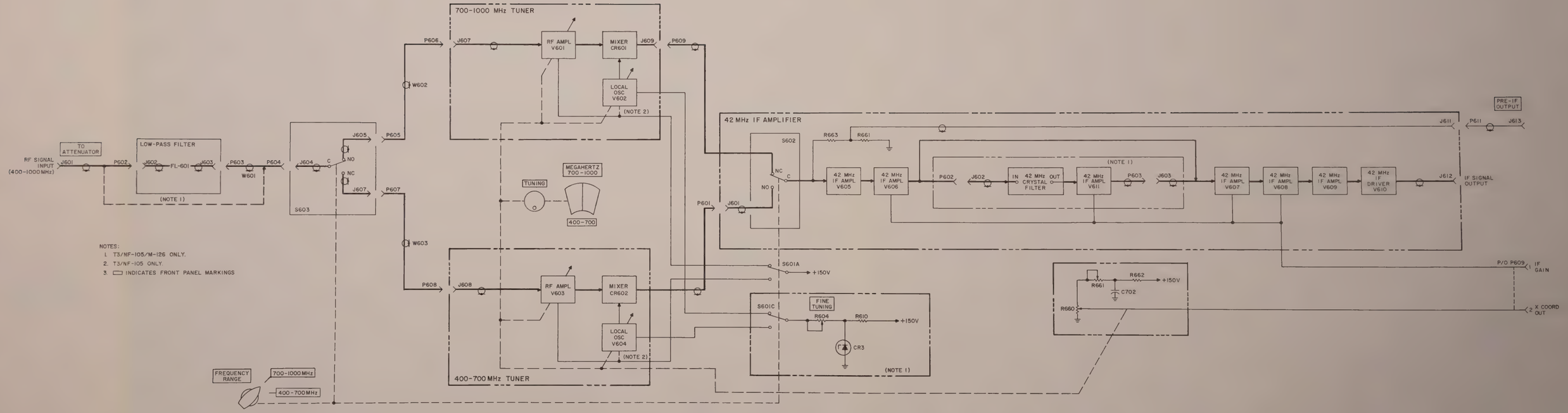
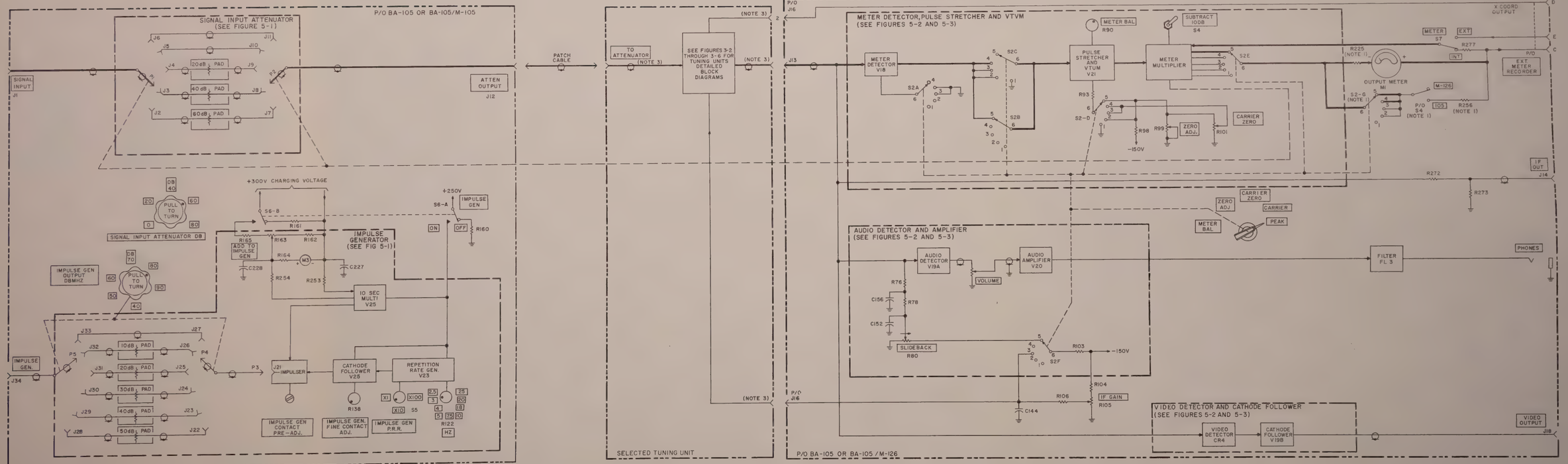


Figure 3-6. Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units, Detailed Block Diagram



NOTES:

1. NF-105/M-126 ONLY
2. ▭ INDICATES FRONT PANEL MARKING.
3. REFER TO CORRESPONDING PLUG-IN TUNING UNIT FOR PROPER REF. DESIG.

Figure 3-7. Models BA-105 and BA-105/M-126 Basic Measuring Units, Detailed Block Diagram

delay of the transmission line. An impulse noise spectrum, flat from 0.01 to 1000 MHz, is obtained from the extremely short pulses.

3-56. Stage V24 is an astable multivibrator that reverses the polarity of the transmission line charging voltage (though relay K1) every 10 seconds. Polarity reversal is required to minimize contact degradation.

3-57. CALIBRATED STEP ATTENUATOR. (See figures 3-7, and 5-1.) The basic unit contains two calibrated coaxial step attenuators, one of which is used in the r-f signal input circuit and the other in the impulse generator output circuit. The signal input attenuator consists of five 50-ohm coaxial segments, two segments having 0 dB loss and the remaining three segments having 20, 40, and 60 dB loss. The impulse generator attenuator, a level control, consist of six 50-ohm segments which vary the output level from 40 to 90 dB above 1μV/MHz, in 10 dB steps. Each attenuator segment is a resistive "T" pad in which the series elements are rod resistors, and the shunt element is a disc-type resistor.

3-58. THEORY OF OPERATION, POWER SUPPLY. (See Figure 5-1.)

3-59. The voltages required to operate the various circuits of the equipment are obtained from a self-contained regulated power supply. The regulated power supply furnishes the following voltages: +150 vdc, +250 vdc, +300 vdc (ungrounded), -150 vdc, and 6.3 vac. These voltages are regulated to offset changes in either the primary supply voltages or varying current drains by the various circuits.

3-60. Regulation is accomplished by means of a vibrating finger regulator (regohm VR 1) which samples the +150-vdc supply voltage and connects different resistors in series with the input power transformer (T11), maintaining the level of the sampled voltage at +150 volts. The +150-, +250-, and +300-vdc supply voltages are obtained from full-wave rectifiers V26, V27, V29 and V30; the -150-vdc supply voltage is obtained from half-wave rectifier V28 and further regulated by gas tube regulator V31. Regohm VR 1 is enclosed in a shield can to prevent radio frequency interference.

SECTION IV
MAINTENANCE

4-1. GENERAL.

4-2. This section contains maintenance, alignment and calibration instructions for the Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters. Included are a list of test equipment necessary to maintain the equipment, minimum performance standards checks to evaluate whether the equipment operates within published specifications, systematic troubleshooting procedures to localize a malfunction to an individual subassembly or circuit and alignment and calibration procedures necessary to restore the equipment to proper operating condition after the required repairs have been effected.

4-3. TEST EQUIPMENT REQUIRED.

4-4. The test equipment required for the maintenance, alignment and calibration of the equipment is listed in table 4-1. Equipment having similar characteristics may be substituted for those listed in the table.

4-5. PRELIMINARY INSPECTION.

4-6. Preliminary inspection of the equipment is performed without operating power applied. This type of check is designed to detect conditions that otherwise might lead to a breakdown. Frequent causes of premature failure are overheating due to improper ventilation, accumulation of dust and dirt and/or loose connections and fittings. Inspection is carried out with emphasis on finding evidence of these conditions.

4-7. COMPONENT LOCATIONS. The major components of the equipment, plus all the components mentioned in the inspection, alignment and troubleshooting procedures supplied in this section, are illustrated in figures 4-1 through 4-27.

TABLE 4-1. REQUIRED TEST EQUIPMENT

Manufacturer	Nomenclature
United Systems	Digitec Model 201 Voltmeter
Walsco	Model 2540 Tooling Wand
Hewlett-Packard	Model 608 Signal Generator
General Radio	Model 1001 Signal Generator
Tektronix	Model 531A Oscilloscope with type D plug-in unit
Singer Metrics	Empire Model AT-103-B Step Attenuator
Hewlett-Packard	Model 5245L Electronic Counter
Hewlett-Packard	Model 5254A Frequency Converter
Simpson	Model 260 VOM
(Fabricate per figure 4-32)	Brass and Fiber Tuning Wands
Singer Metrics	Model SU-105 Switching Unit
General Radio	Type W5MT3A Autotransformer
Hewlett-Packard	Model 612A Signal Generator

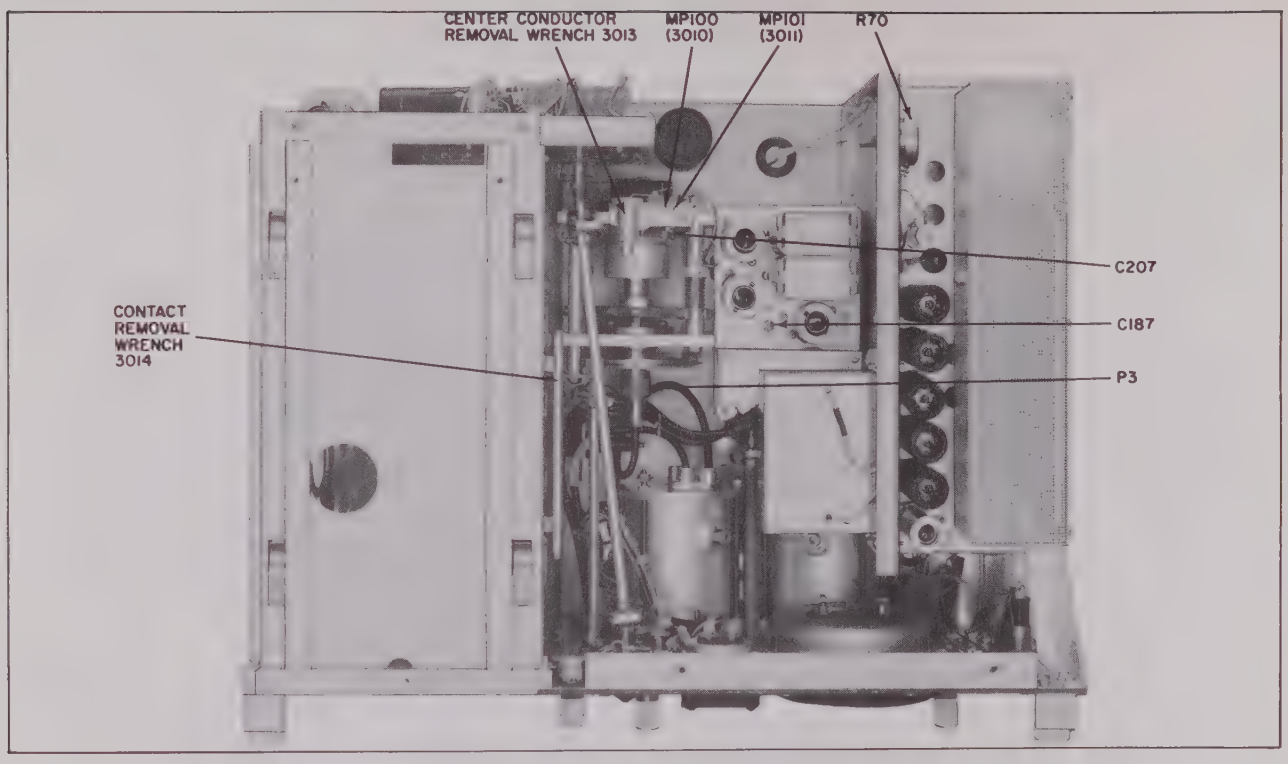


Figure 4-1. Models BA-105 and BA-105/M-126 Basic Measuring Units, Top View

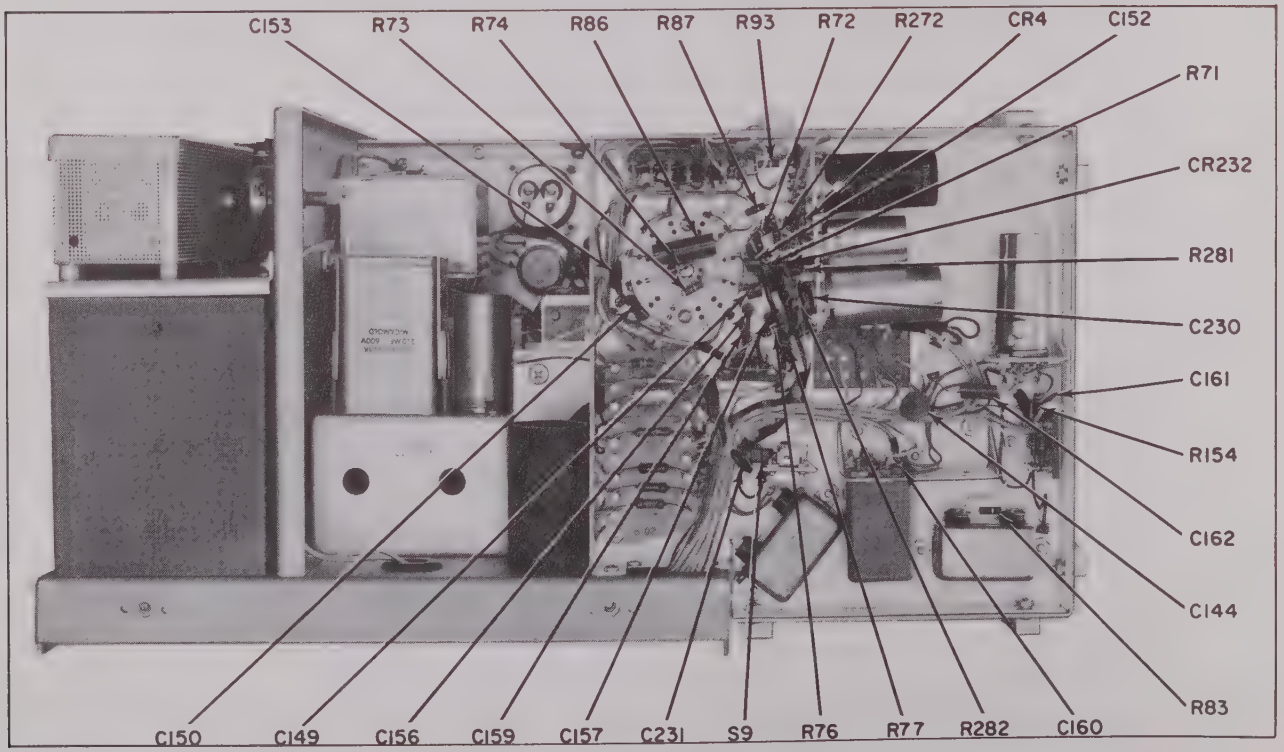


Figure 4-2. Models BA-105 and BA-105/M-126 Basic Measuring Units, Rear View

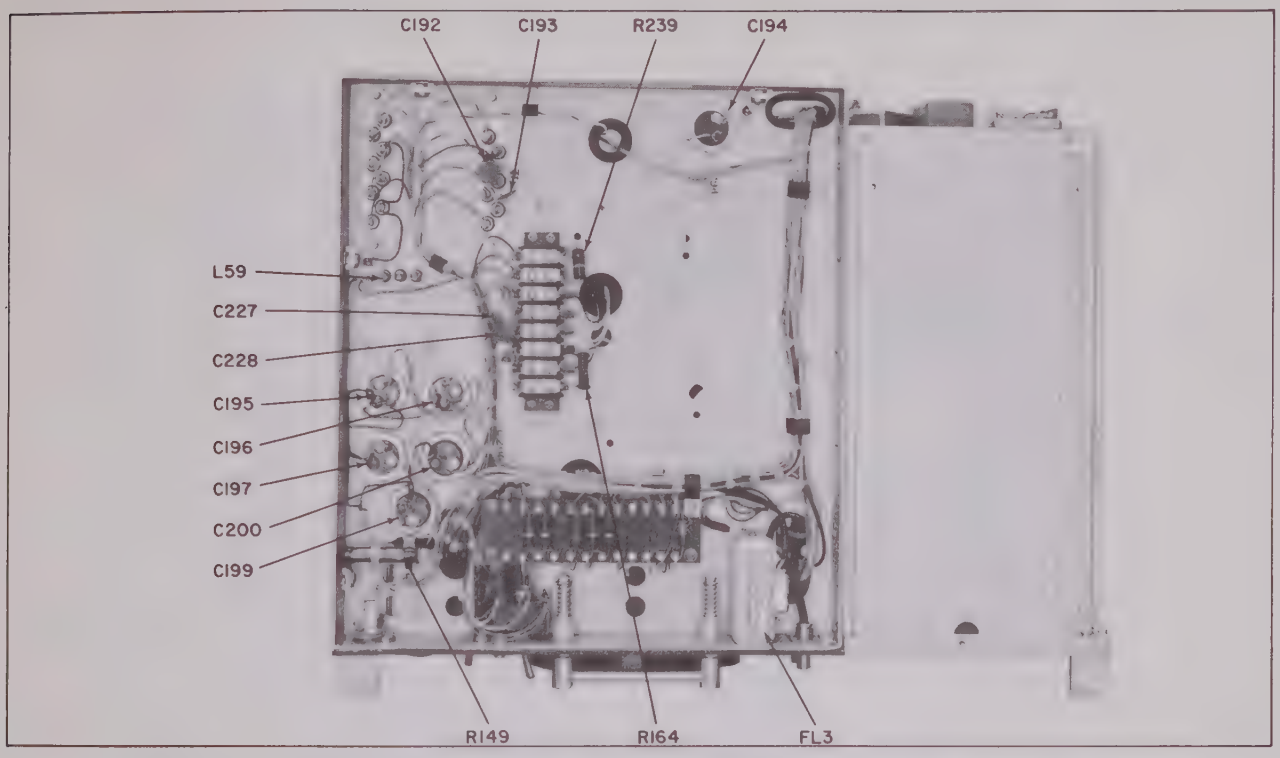


Figure 4-3. Models BA-105 and BA-105/M-126 Basic Measuring Units, Bottom View

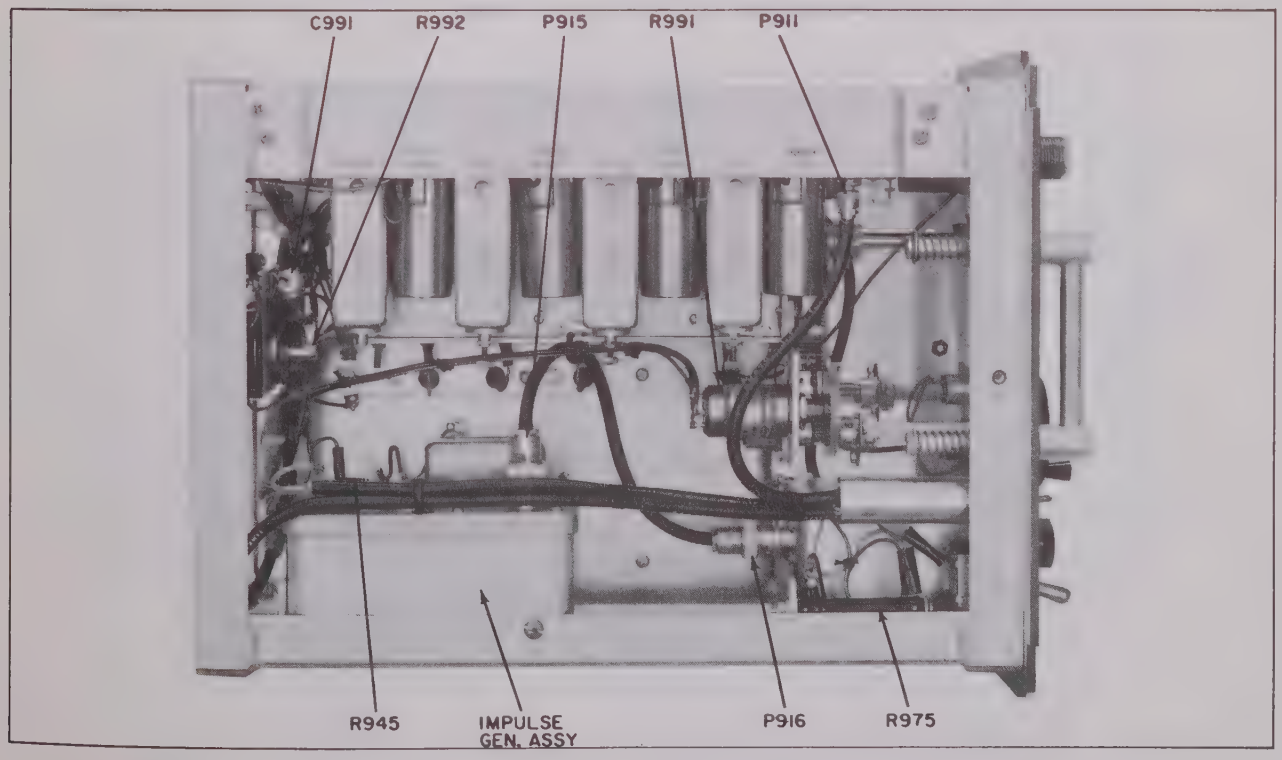


Figure 4-4. Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, Left Side View

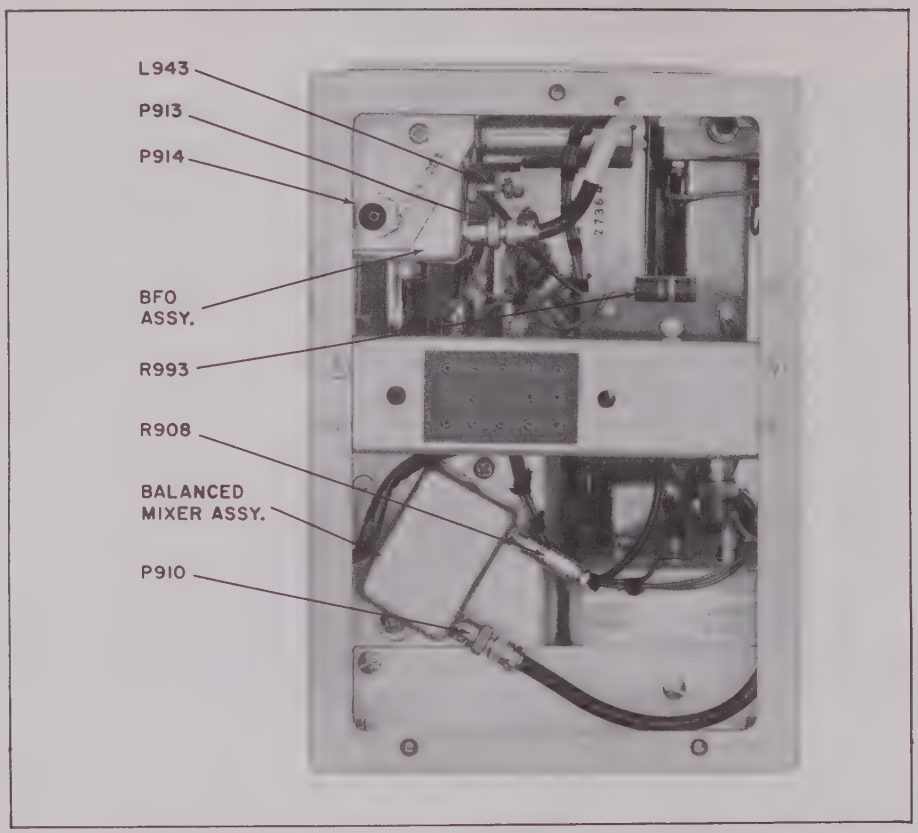


Figure 4-5. Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, Rear View

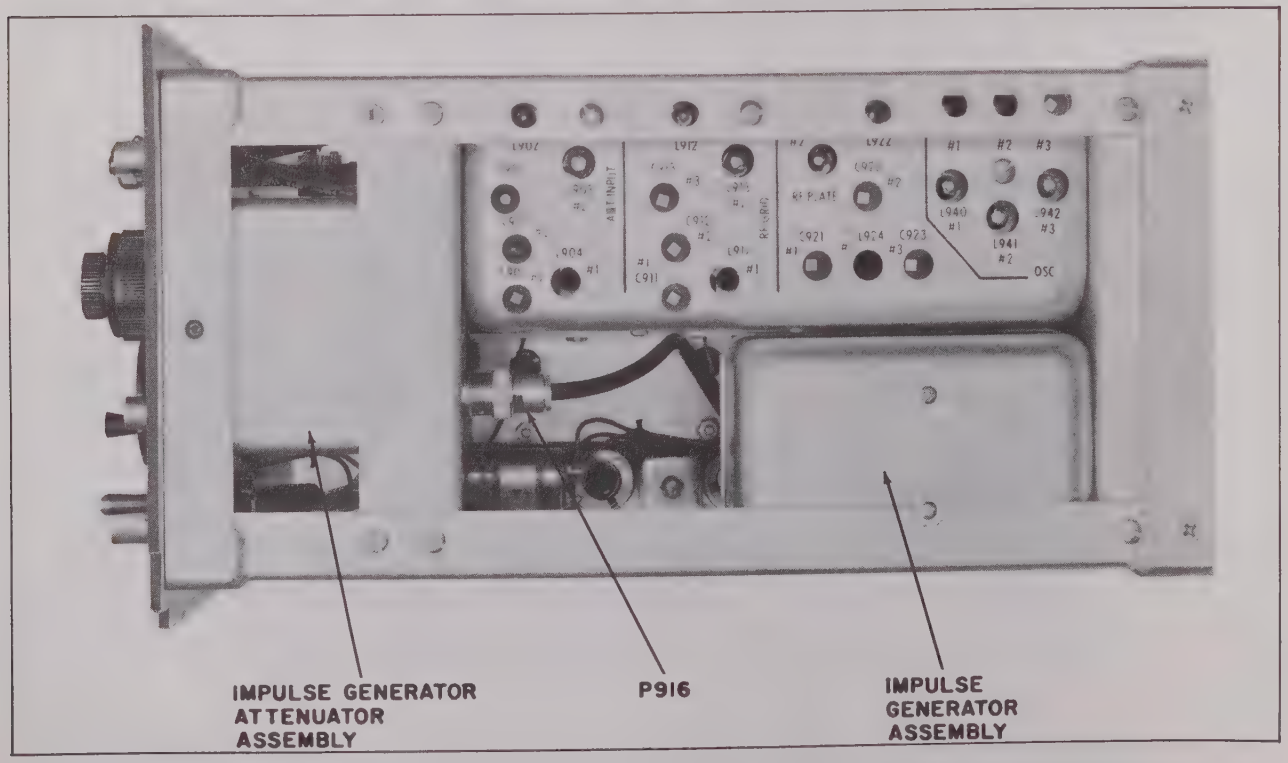


Figure 4-6. Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, Bottom View

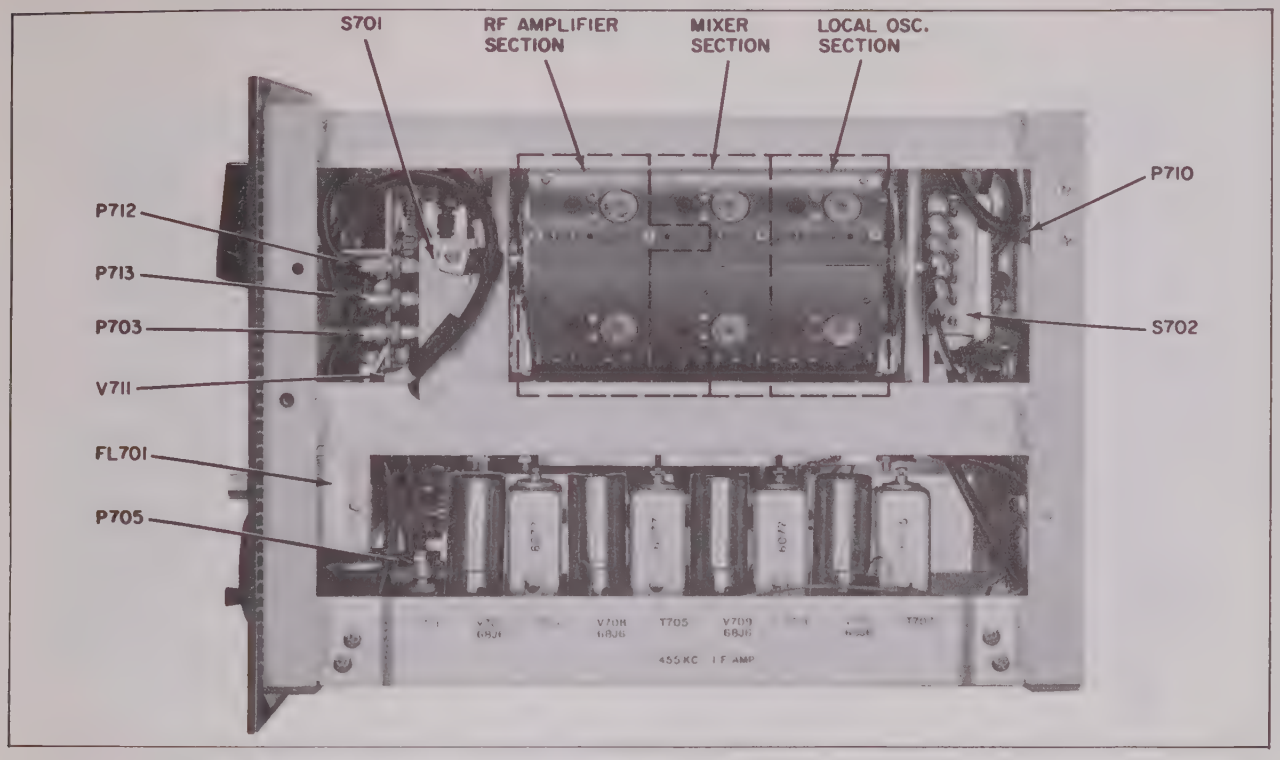


Figure 4-7. Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, Right Side View

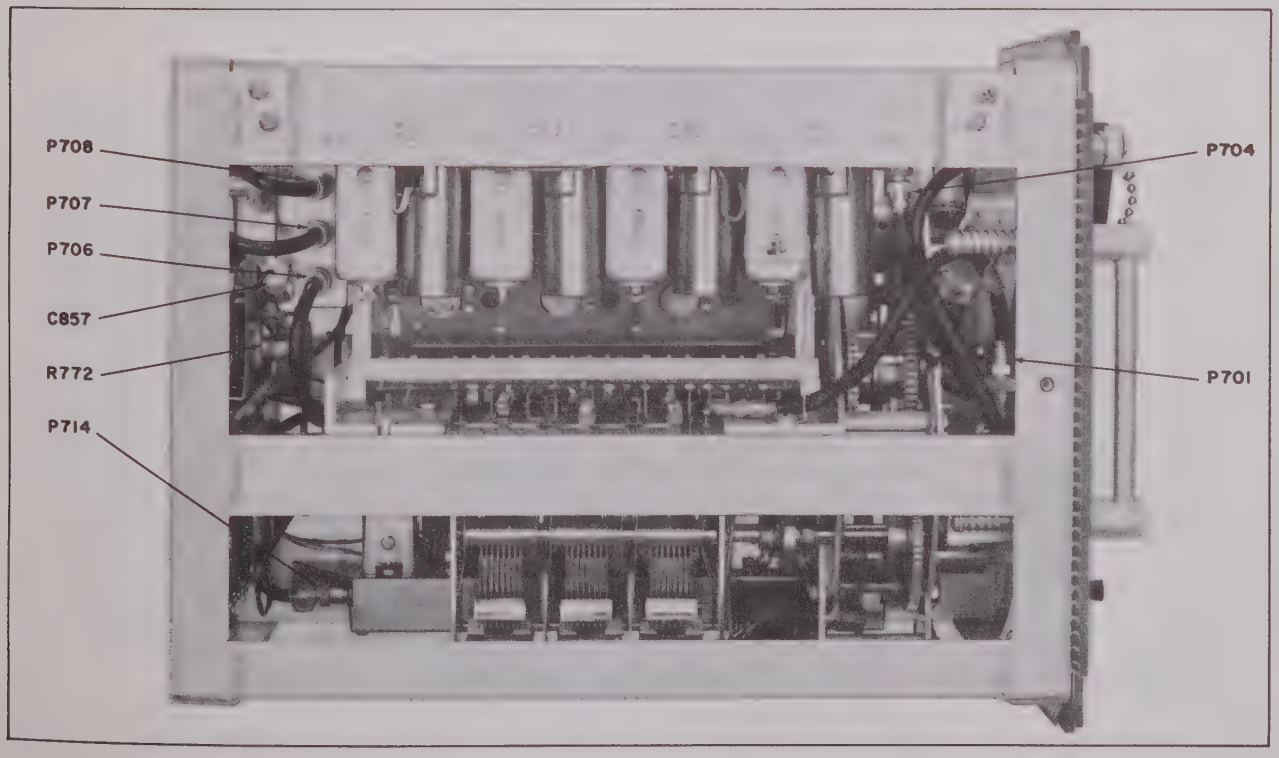


Figure 4-8. Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, Left Side View

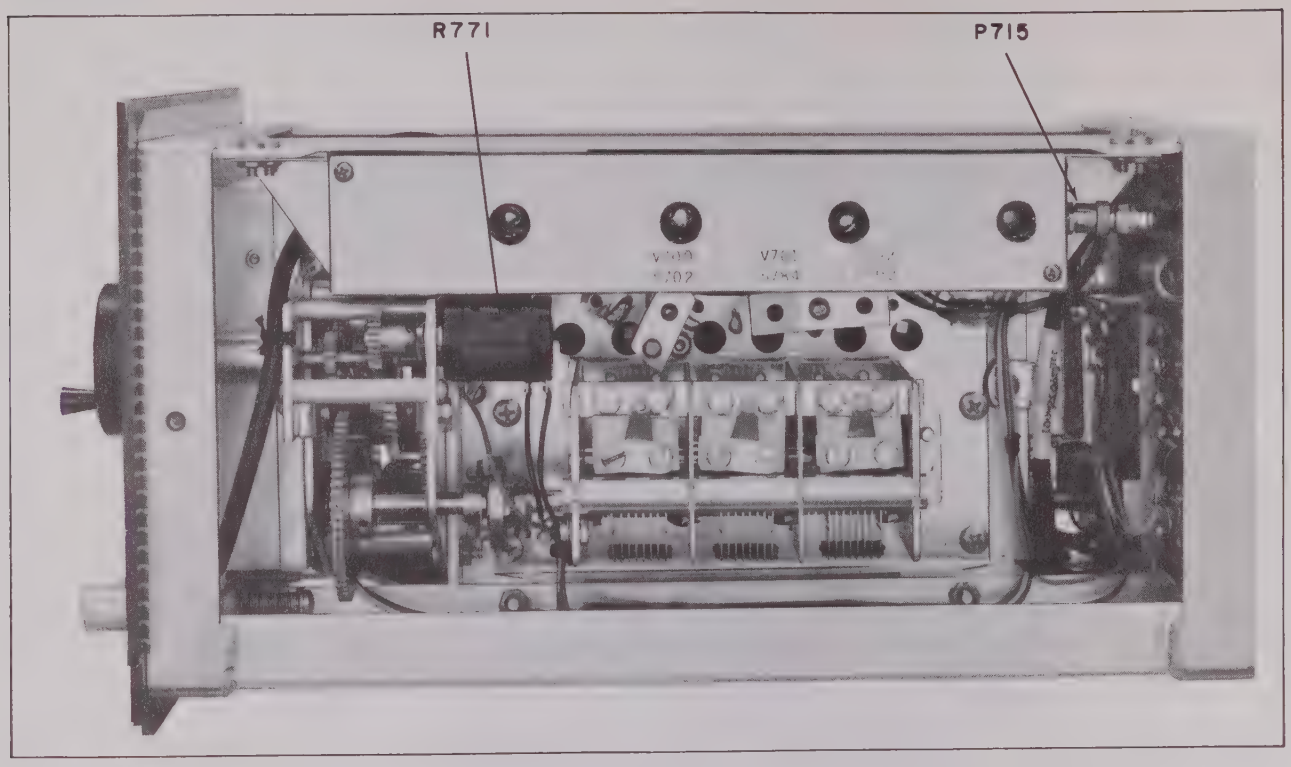


Figure 4-9. Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, Bottom View

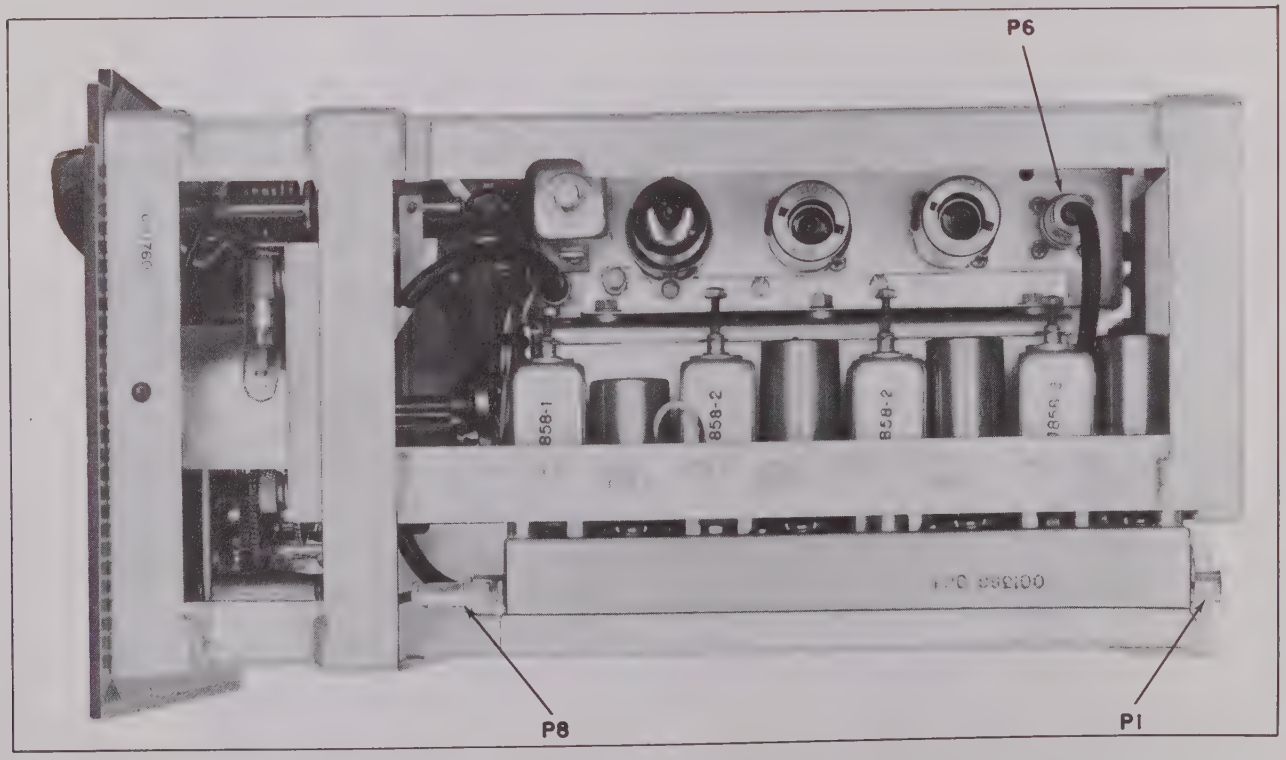


Figure 4-10. Model T-1/NF-105 Tuning Unit, Top View

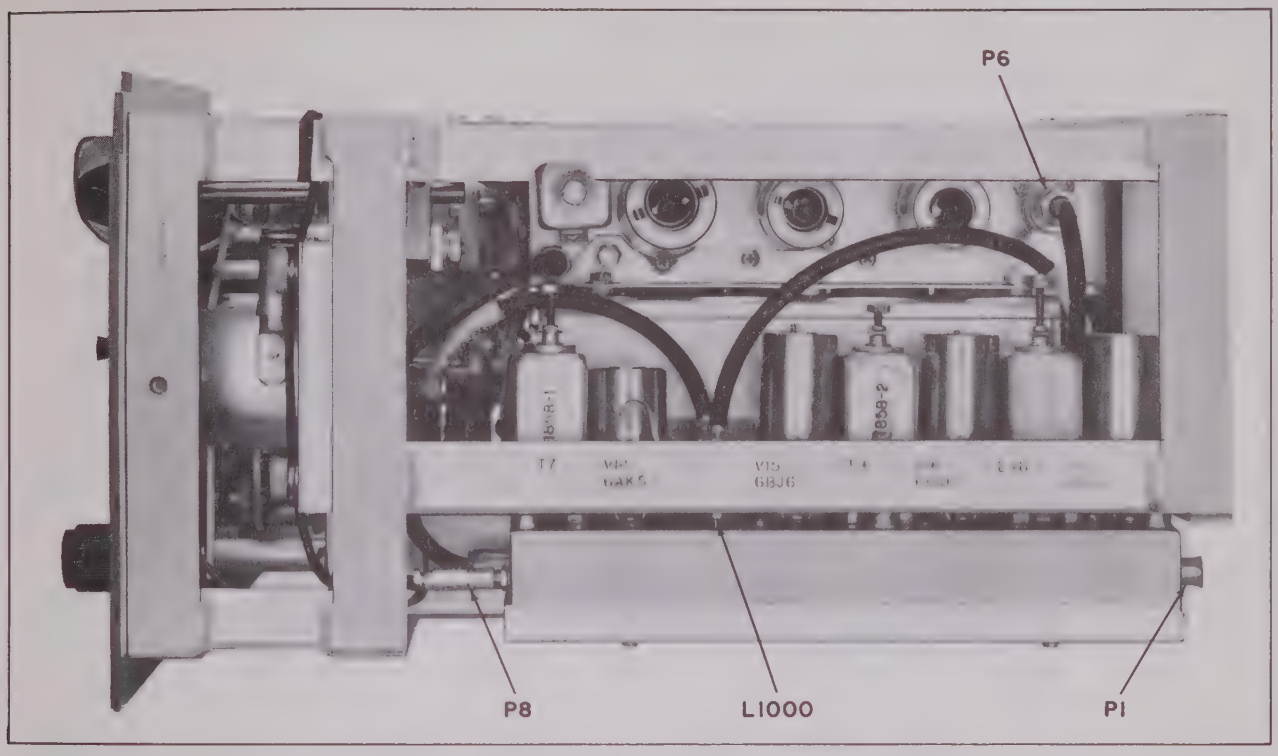


Figure 4-11. Model T-1/NF-105/M-126 Tuning Unit, Top View

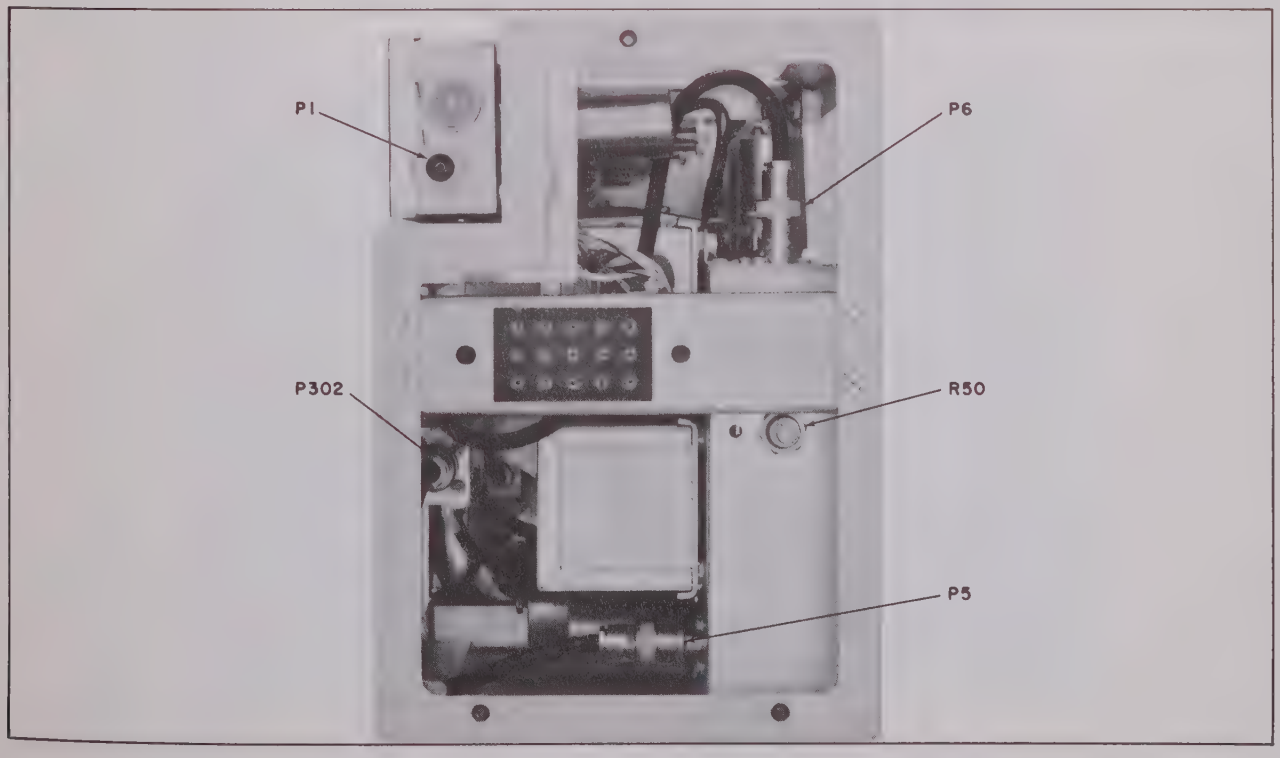


Figure 4-12. Model T-1/NF-105 Tuning Unit, Rear View

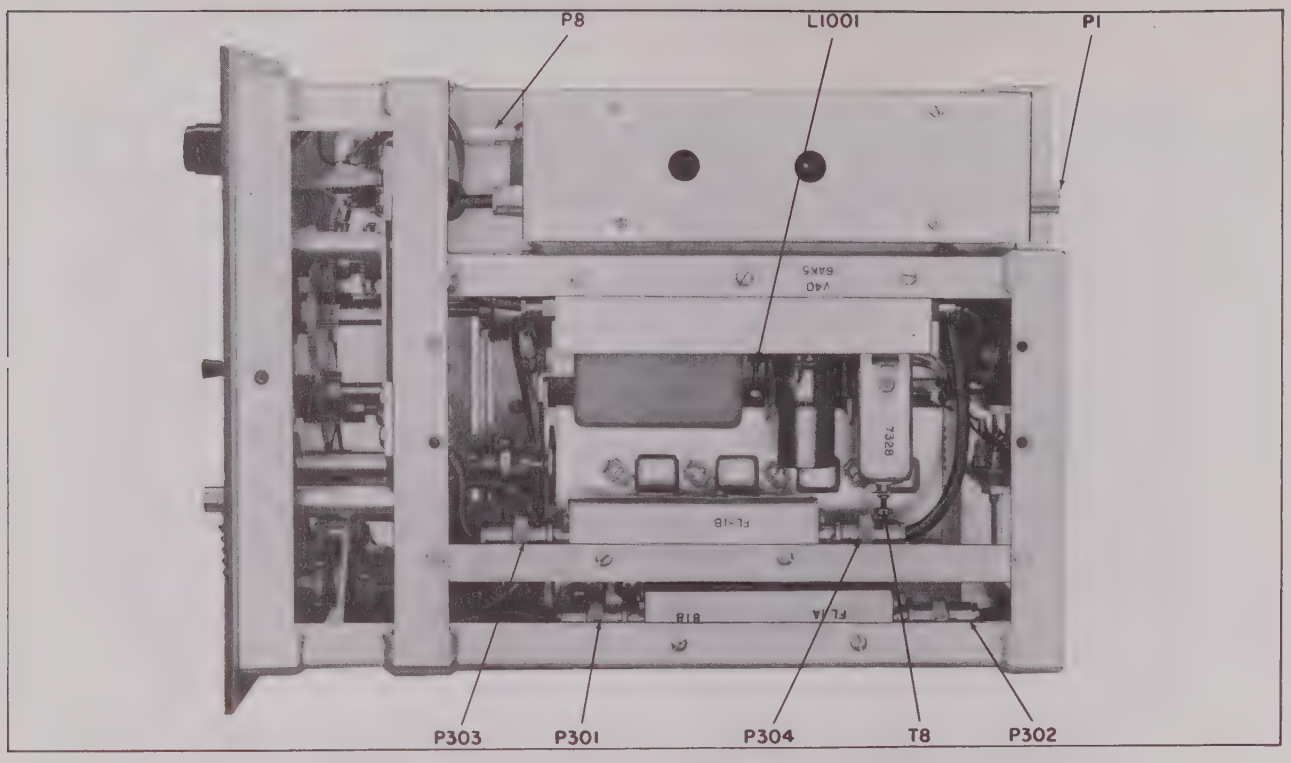


Figure 4-13. Model T-1/NF-105/M-126 Tuning Unit, Right Side View

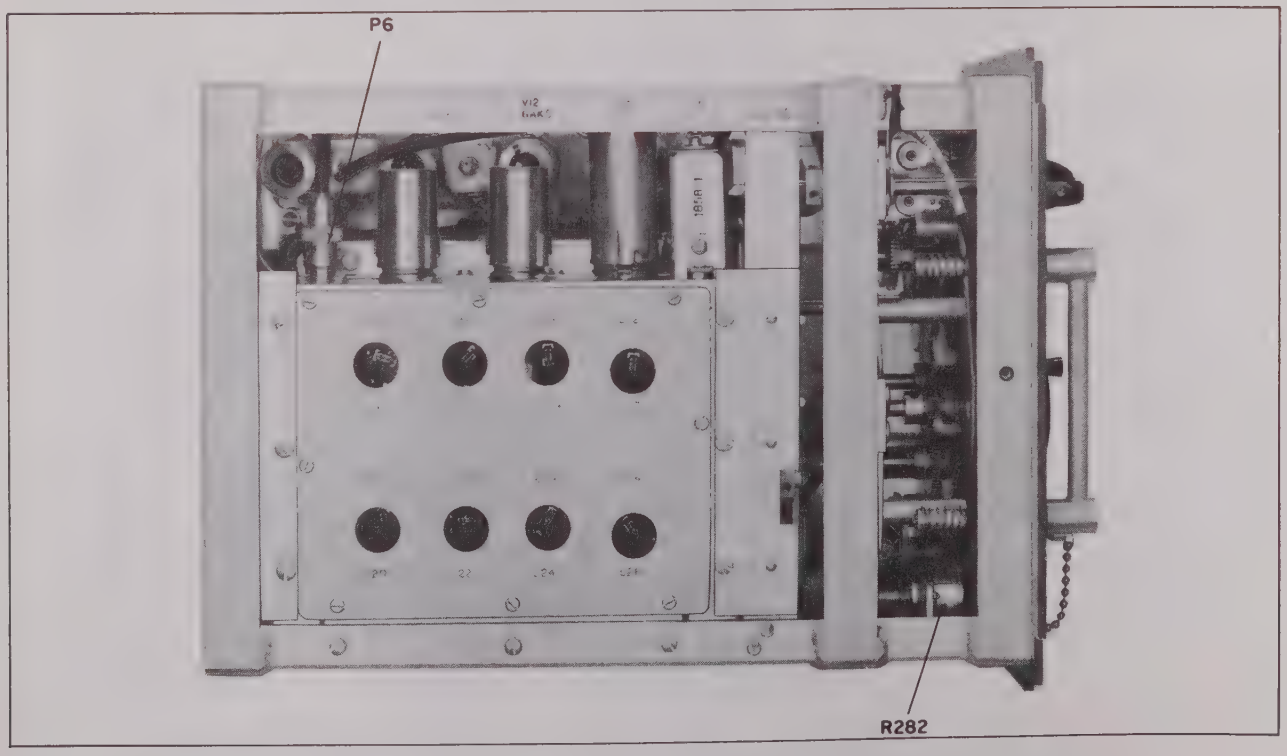


Figure 4-14. Models T-1/NF-105 and T-1/NF-105/M-126 Tuning Units, Left Side View

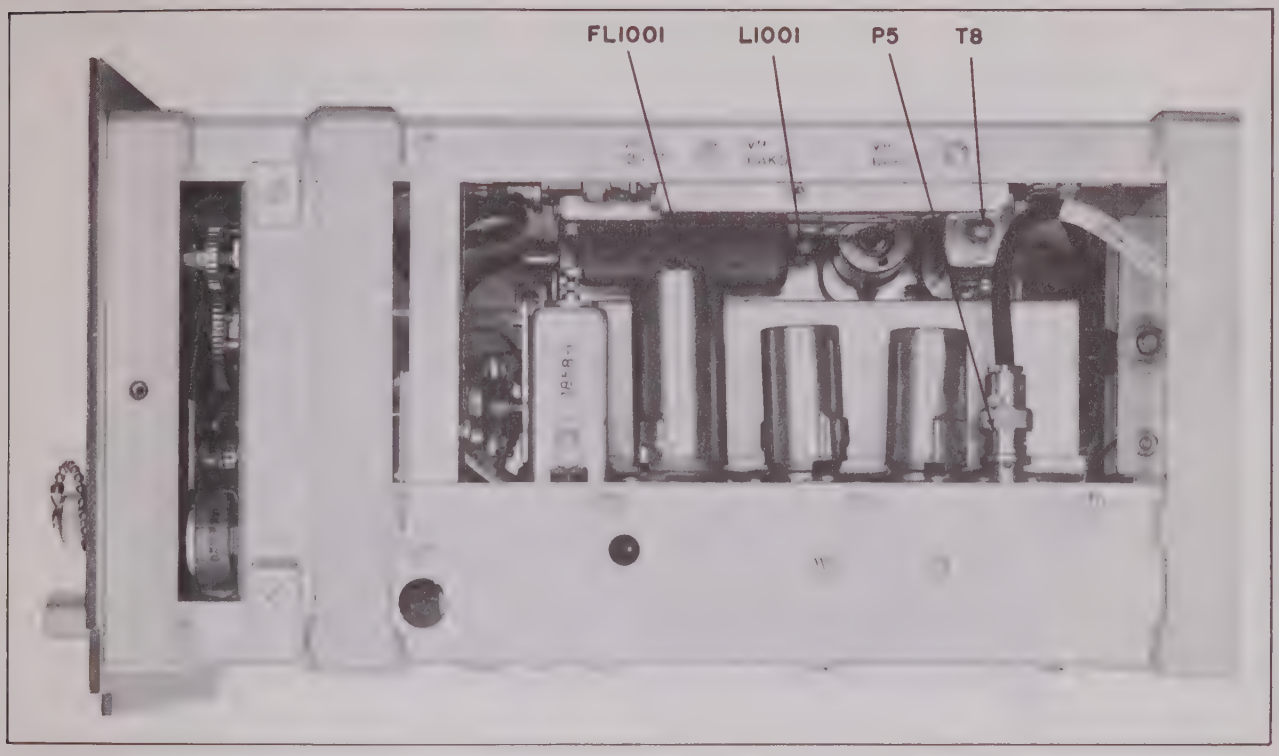


Figure 4-15. Model T-1/NF-105/M-126 Tuning Unit, Bottom View

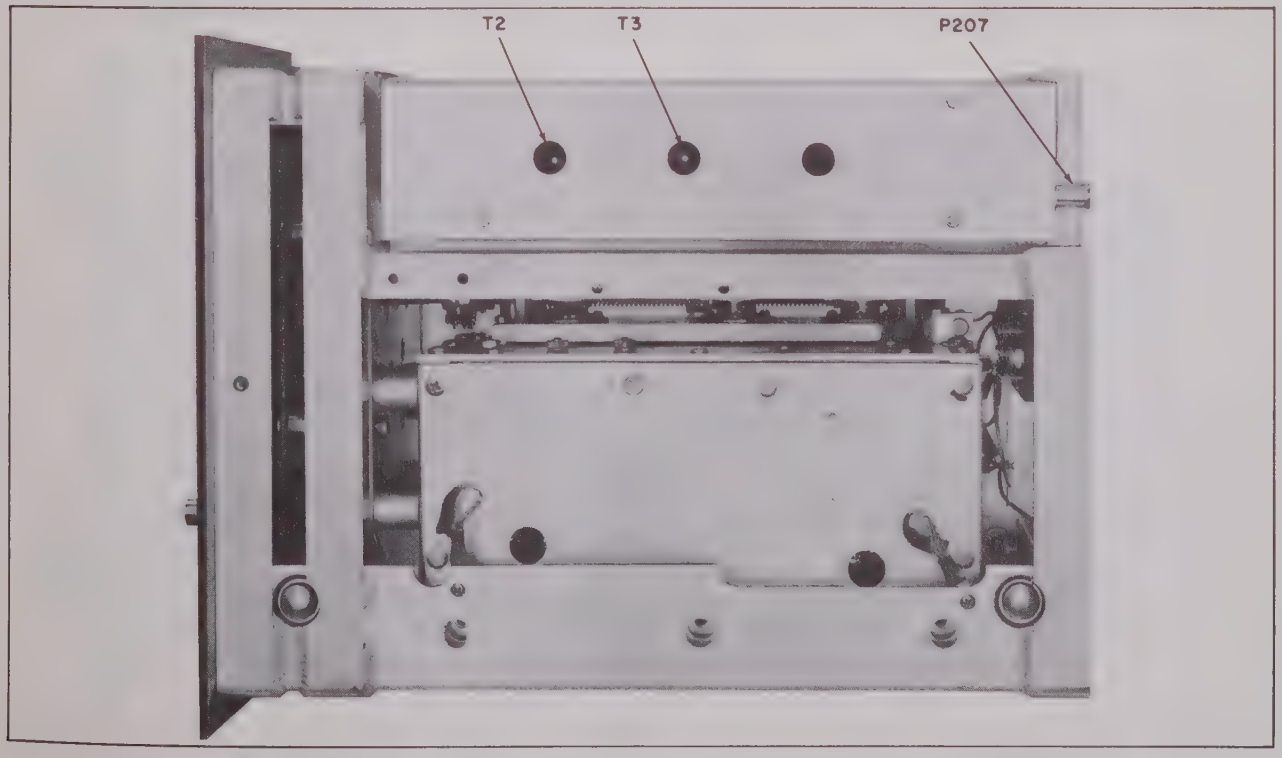


Figure 4-16. Model T-2/NF-105 Tuning Unit, Right Side View

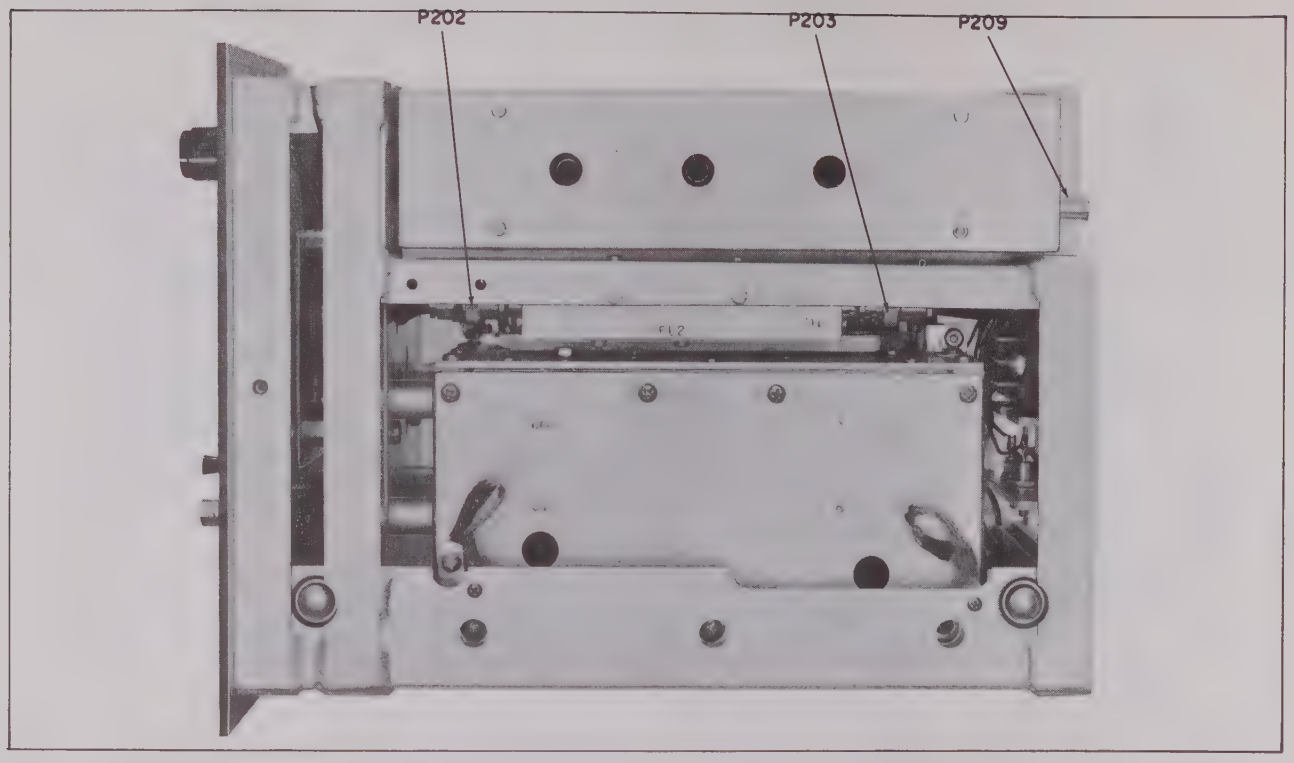


Figure 4-17. Model T-2/NF-105/M-126 Tuning Unit, Right Side View

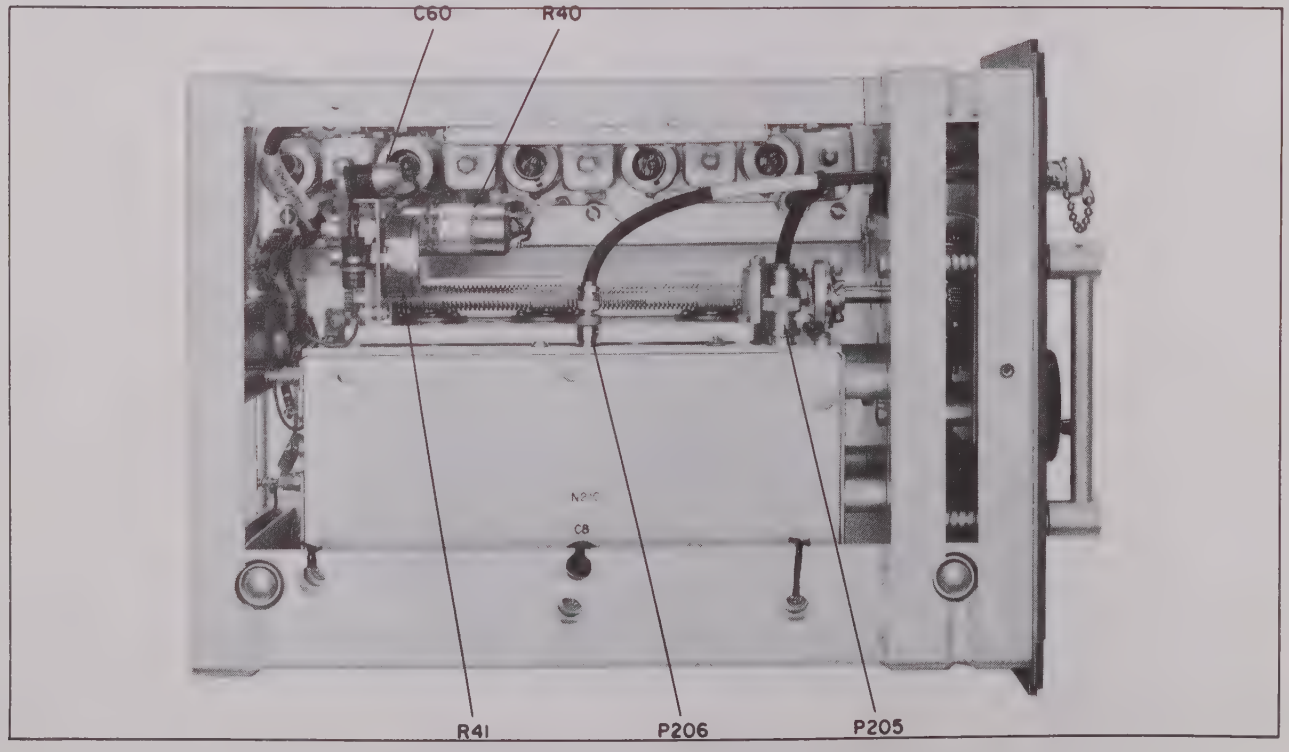


Figure 4-18. Model T-2/NF-105 Tuning Unit, Left Side View

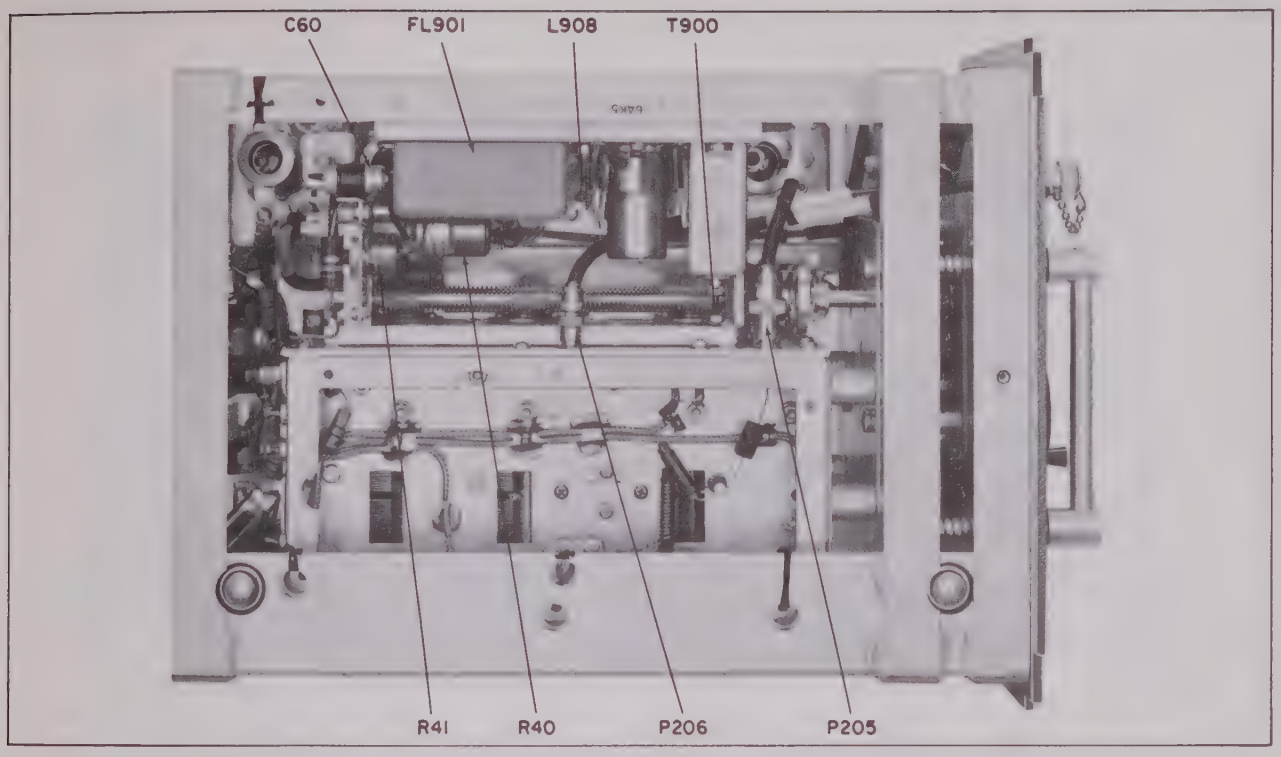


Figure 4-19. Model T-2/NF-105/M-126 Tuning Unit, Left Side View

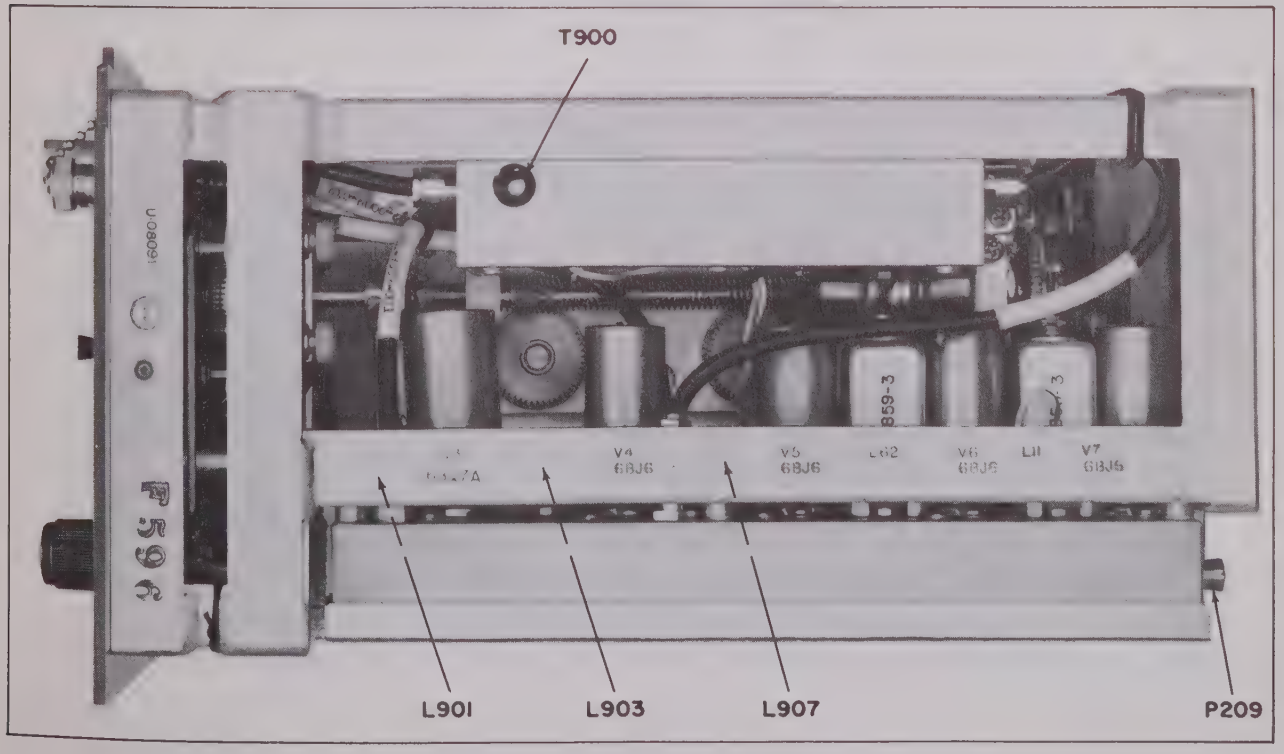


Figure 4-20. Model T-2/NF-105/M-126 Tuning Unit, Top View

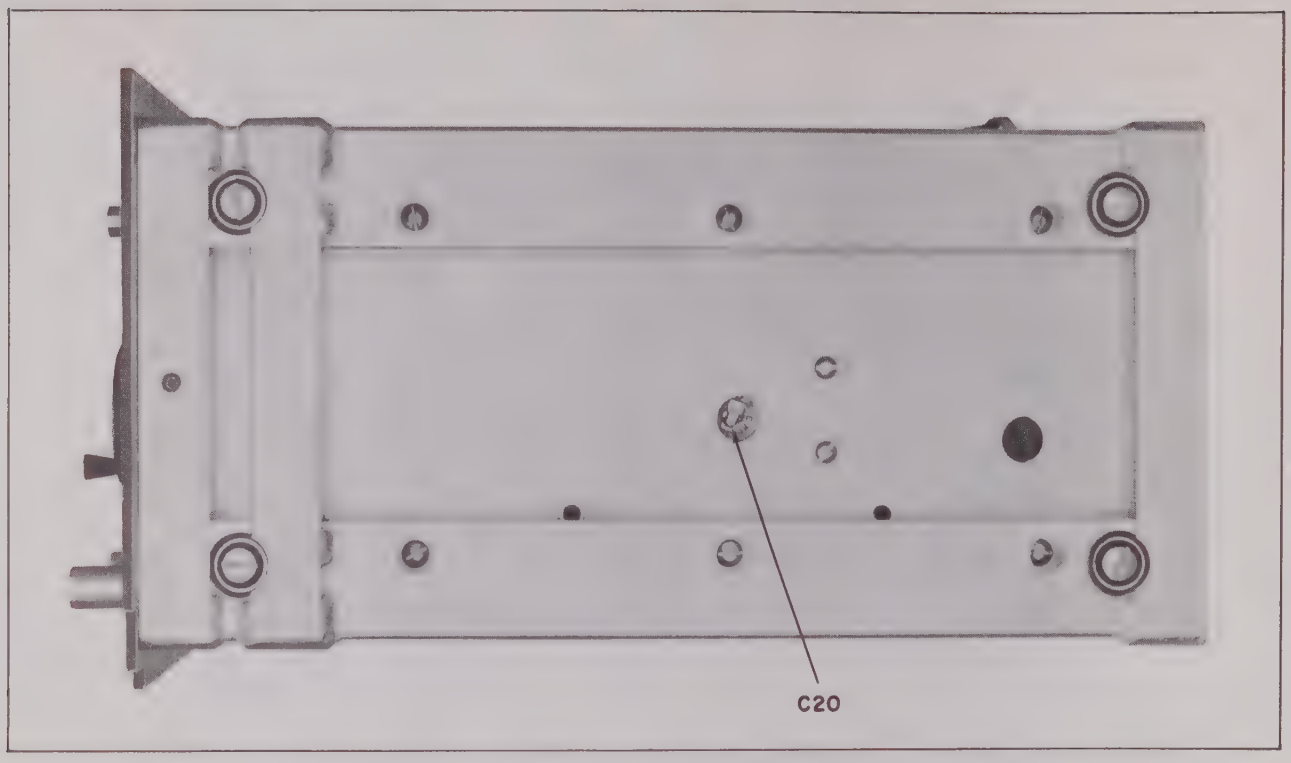


Figure 4-21. Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Units, Bottom View

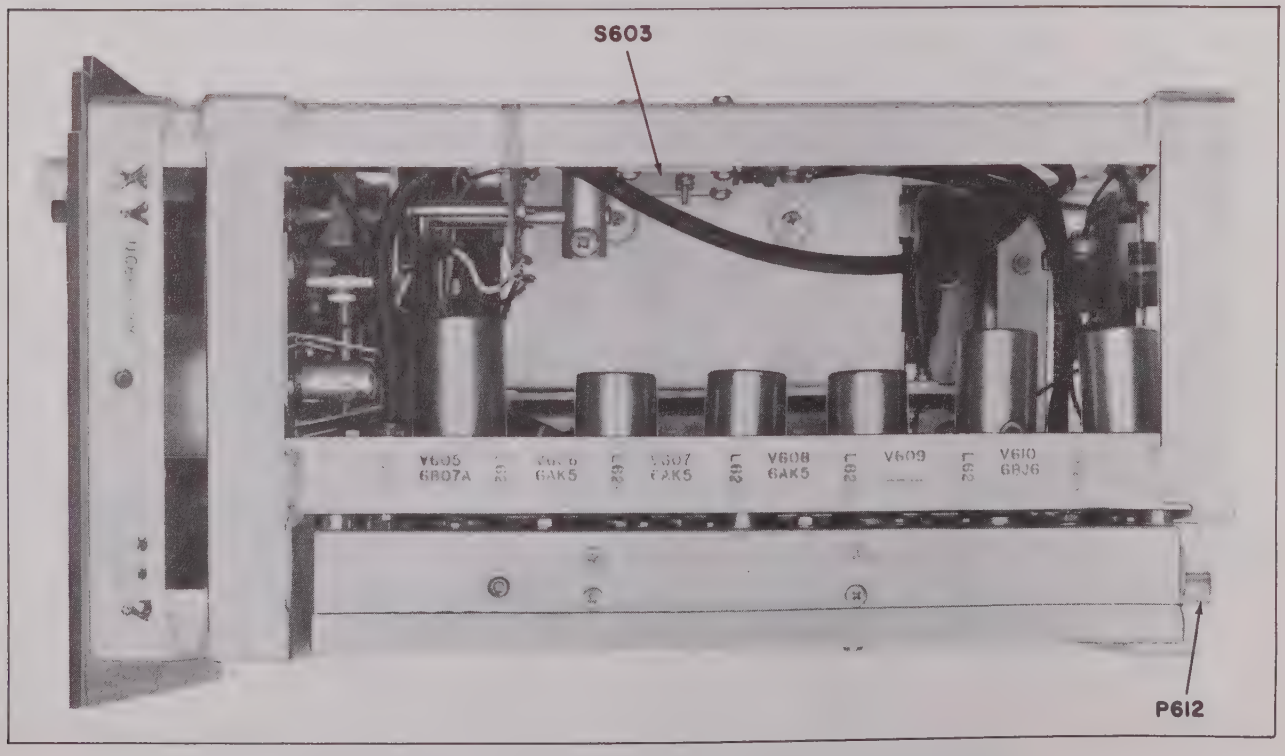


Figure 4-22. Model T-3/NF-105 Tuning Unit, Top View

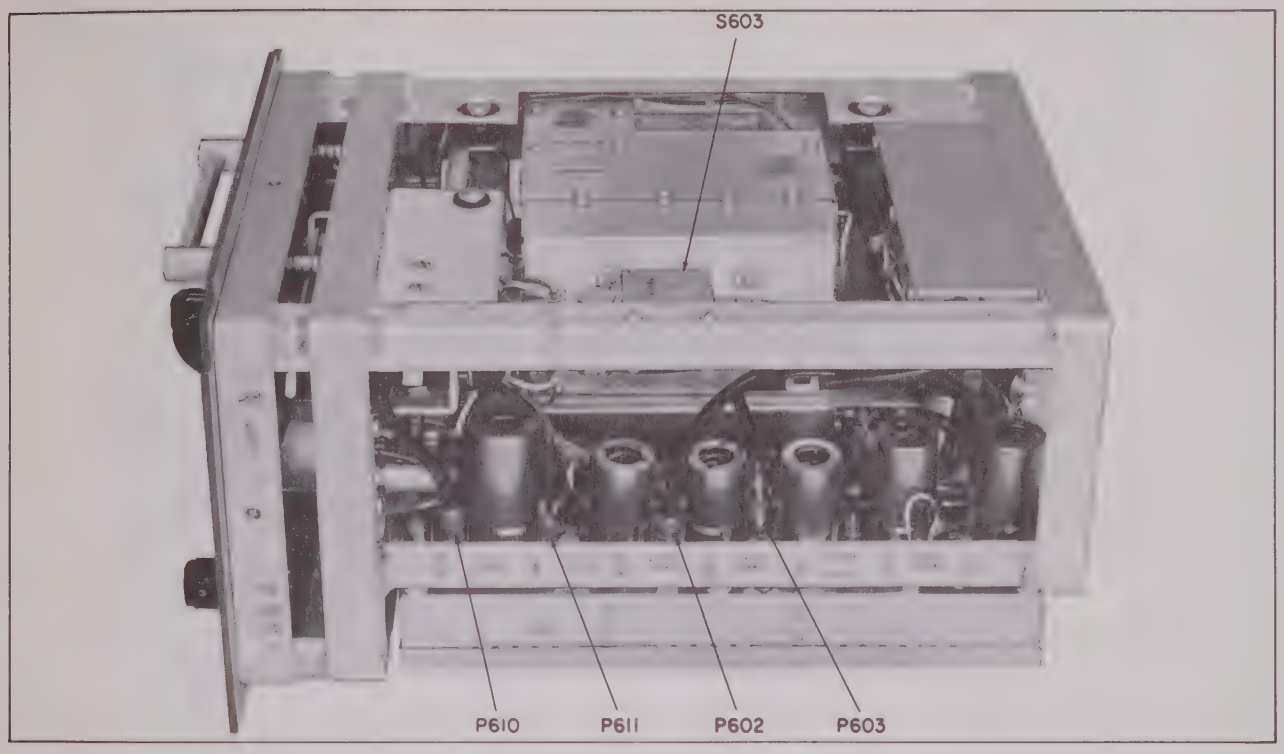


Figure 4-23. Model T-3/NF-105/M-126 Tuning Unit, Top View

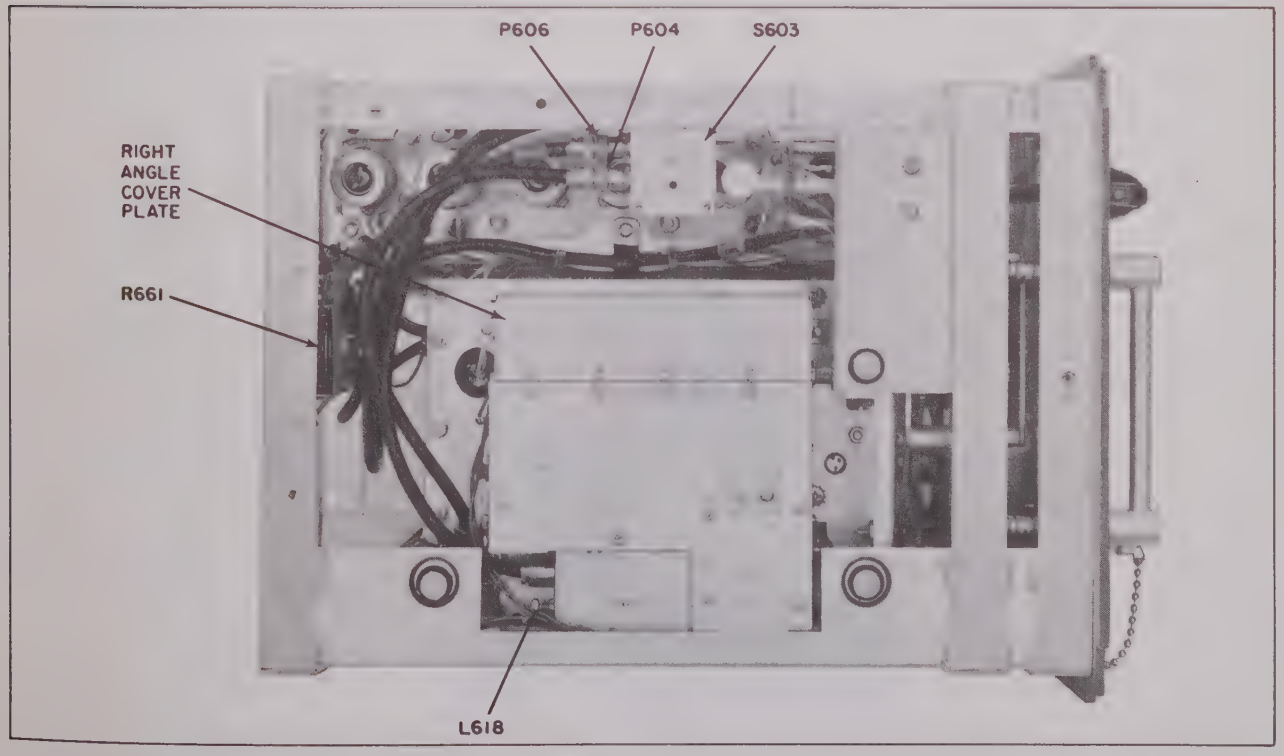


Figure 4-24. Model T-3/NF-105 Tuning Unit, Left Side View

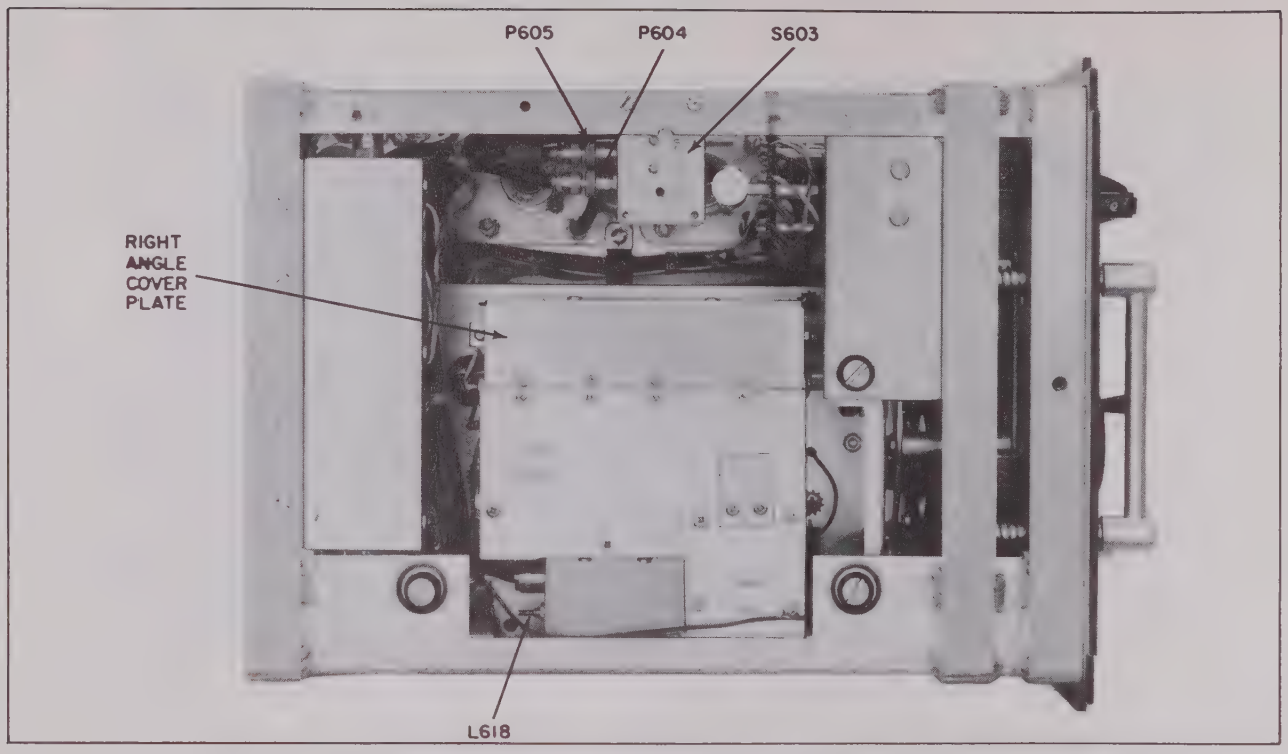


Figure 4-25. Model T-3/NF-105/M-126 Tuning Unit, Left Side View

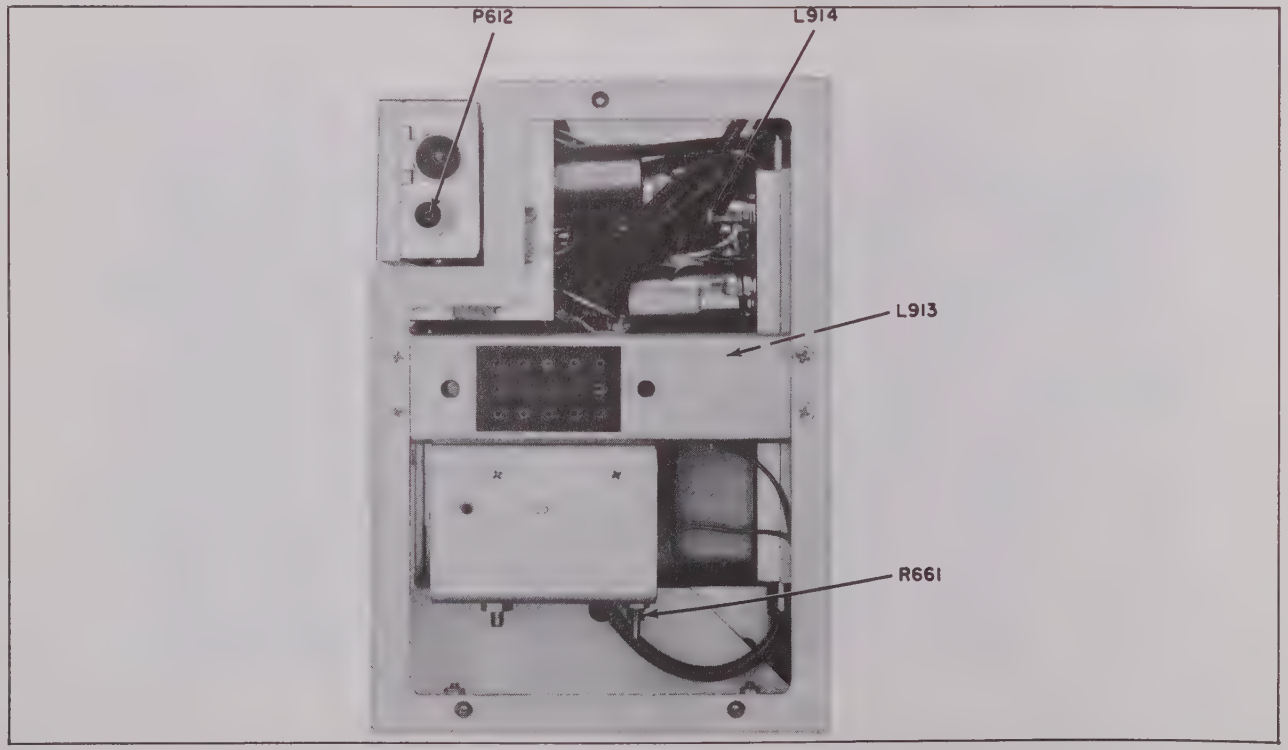


Figure 4-26. Model T-3/NF-105/M-126 Tuning Unit, Rear View

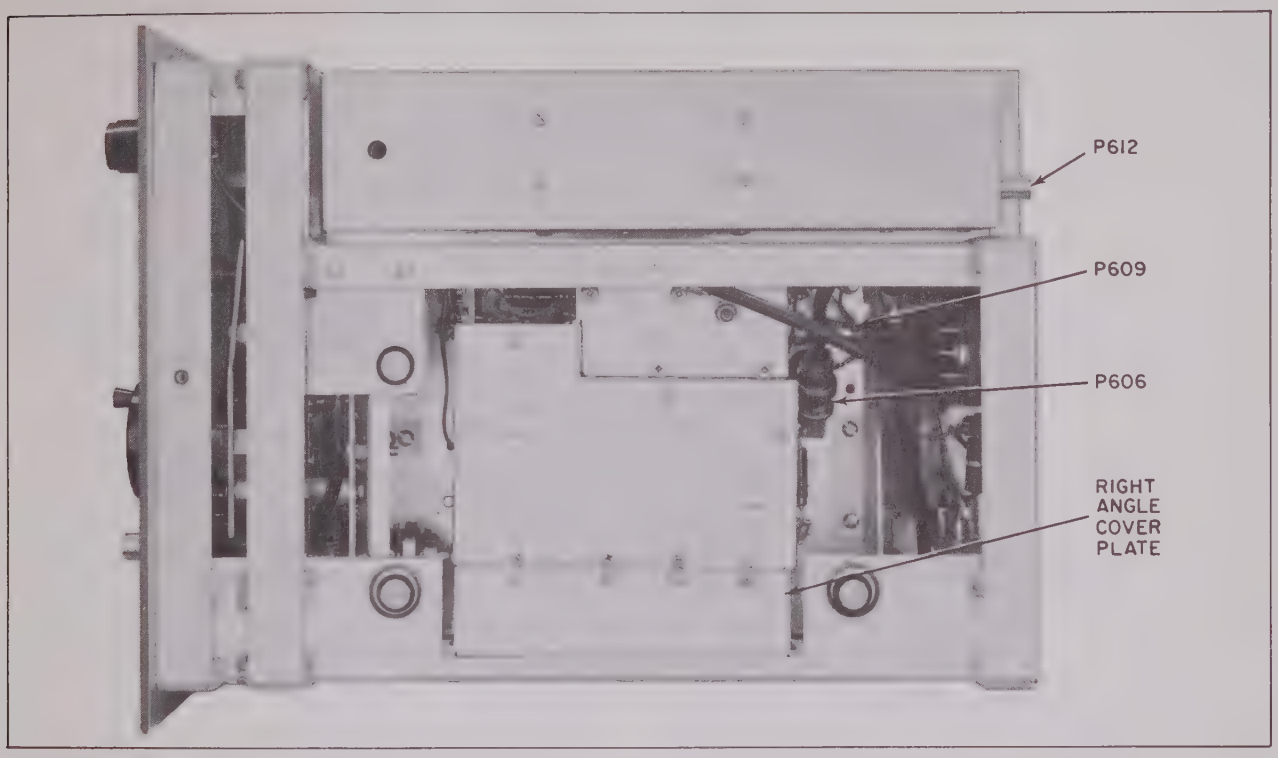


Figure 4-27. Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units, Right Side View

4-8. PRELIMINARY INSPECTION ROUTINE. Table 4-2 details the preliminary inspection routine for the equipment.

4-9. MINIMUM PERFORMANCE STANDARDS.

4-10. The minimum performance standards checks (table 4-3) are a rapid and convenient method of evaluating whether the equipment is functioning within the specifications listed in Section I. Should the equipment fail to provide the "acceptable indication" specified, the operator should refer to the applicable troubleshooting, replacement, repair, alignment and/or calibration procedure to return the equipment to normal operating condition. Energize the equipment as described in paragraphs 2-16 through 2-19 prior to initiating the minimum performance standards checks. The test setup for these checks is illustrated in figure 4-28.

4-11. SYSTEMATIC TROUBLE LOCALIZATION.

4-12. Four possible troubles are presented in this procedure to illustrate a systematic approach to the isolation of a trouble in the Noise and Field Intensity Meter. Note that full use is made of the maintenance information in the manual (e.g. the detailed block diagrams, the voltage and resistance charts, and the schematics).

4-13. The four problems that will be considered are:

a. Abnormal meter, audio, and video indications.

b. Abnormal meter indication; audio and video indications are normal.

c. Abnormal audio indication; meter and video indications are normal.

d. Abnormal video indication; meter and audio indications are normal.

4-14. ABNORMAL METER, AUDIO AND VIDEO INDICATIONS. An approach to this problem is as follows:

Note

This procedure is performed with the tuning unit connected to basic unit via the type AH-105 Alignment Harness.

a. Check the power supply voltages (paragraph 4-18).

b. If the power supply voltages are correct, check the i-f output signal at the output connector of the tuning unit with an oscilloscope. With the IF GAIN control and SIGNAL INPUT ATTENUATOR DB switch set to maximum clockwise and 40, respectively, the following outputs should be obtained

TABLE 4-2. PRELIMINARY INSPECTION ROUTINE

Item	Inspect For	Corrective Action
Connectors	Looseness, bent or corroded contacts, signs of arcing	Clean contacts with cloth moistened with cleaning solvent (trichloroethylene or equivalent). Replace jack if damaged or deeply corroded.
Knobs, screws, connectors, and clamps	Looseness	Tighten using appropriate torque so as not to strip threads.
Switches	Looseness	Tighten mounting screws or nut.
Wiring	Looseness	Resolder, recable, or reclamp.
	Frayed, worn, or missing insulation	
Solder joints	Loose or cold solder connections; corrosion	Clean carefully and resolder.
Resistors	Cracks, chipping, blistering, discoloration, and other signs of overheating.	Replace with exact match of original. **Note** Insure that overheating is not due to other defective components.
Capacitors	Leaks, bulges, signs of aging.	Replace capacitor.
	Loose mounting bracket	Tighten nuts or screws holding bracket.
Switch contacts	Dirt, dust, and/or corrosion	Clean with cloth, aerosol spray, syringe, or camel's hair brush using trichloroethylene or equivalent.
	Bent or broken contacts	Replace switch wafer or assembly.
Tubes	Looseness	Seat properly in sockets.
Tube shields	Improper mounting	Mount properly over tube.

from the various tuning units with a CW input signal of 10 microvolts (rms) applied to the SIGNAL INPUT connector on the basic unit:

Tuning Unit	I-f Output (Peak-to-Peak)
T-A/NF-105	11 volts (nominal)
T-X/NF-105 and T-X/NF-105/M-126	0.8 volt (nominal)
T-1/NF-105	4.5 volts (nominal)
T-2/NF-105	7 volts (nominal)
T-3/NF-105	15 volts (nominal)
T-A/NF-105/M-126	22 volts (nominal)
T-1/NF-105/M-126	4.5 volts (nominal)
T-2/NF-105/M-126	7 volts (nominal)
T-3/NF-105/M-126	15 volts (nominal)

c. If the i-f output signal of the tuning unit is normal, troubleshoot the circuitry on the basic unit common to the metering, audio, and video circuits by signal tracing and/or using the voltage and resistance checks.

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS

Step	Purpose	Procedure	Acceptable Indication
		Note The T-X/NF-105 and T-X/NF-105/M-126 tuning units require a four-hour warmup period before performing this check.	
1	To check accuracy of TUNING control (dial calibration accuracy).	Set SIGNAL INPUT ATTENUATOR DB switch to 80, adjust calibrated step attenuator for 0 dB insertion and set signal generator to 0.1 volt rms output. Set Function Selector switch to CARRIER. Using TUNING control on tuning unit, select a frequency at the low end, middle, and high end of each frequency band. Adjust frequency control on signal generator for a maximum indication on basic unit output meter for each of the selected frequencies. (Adjust IF GAIN control to maintain an on-scale reading meter.) Record indication on frequency counter for each frequency.	The accuracy of the TUNING control indication shall be equal to or better than that specified below: Tuning Unit — Accuracy T-X/NF-105 and T-X/NF-105/M-126 — 2.5 percent T-A/NF-105, T-A/NF-105/M-126, T-1/NF-105, T-1/NF-105/M-126, T-2/NF-105, and T-2/NF-105/M-126 — 2 percent T-3/NF-105 and T-3/NF-105/M-126 — 1 percent
2	To check narrow band sensitivity of tuning unit(s).	Set TUNING control on tuning unit to frequency indicated below. With equipment set for maximum sensitivity, adjust IF GAIN control to obtain an indication of 3 microvolts on lower scale. Set frequency and level controls on signal generator as indicated below. Set Function Selector switch to CARRIER and SIGNAL INPUT ATTENUATOR DB switch to 0. Observe indication on basic unit output meter. Tuning Unit — Frequency — Input Level T-X/NF-105 and T-X/NF-105/M-126 — 14 kHz, 150 kHz — 0.2 μV T-A/NF-105 — 0.15 MHz, 30 MHz — 0.5 μV	Applied signal causes at least a 3dB rise in output meter noise indication.

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
2 (Cont'd)		Tuning Unit / Frequency / Input Level T-1/NF-105: 20 MHz, 200 MHz — 3.5 μV T-2/NF-105: 200 MHz, 400 MHz — 5 μV T-3/NF-105: 400 MHz, 1000 MHz — 6.5 μV T-A/NF-105/M-126: 0.15 MHz, 30 MHz — 0.25 μV T-1/NF-105/M-126: 20 MHz, 200 MHz — 0.46 μV T-2/NF-105/M-126: 200 MHz, 400 MHz — 0.39 μV T-3/NF-105/M-126: 400 MHz, 1000 MHz — 0.54 μV	
3	To check broad band sensitivity of tuning unit(s).	Set TUNING control on tuning unit and impulse generator output level controls as indicated below. With equipment set for maximum sensitivity, adjust IF GAIN control to obtain an indication of 3 microvolts on lower scale. Set Function Selector switch to PEAK. Energize impulse generator and connect its output to basic unit via SU-105 Switching Unit. Observe indication on basic unit output meter. Tuning Unit / Frequency / Impulse Gen. Output Level (db above 1 μV/MHz) T-X/NF-105 and T-X/NF-105/M-126: 14 kHz, 150 kHz — 35 T-A/NF-105: 0.15 MHz — 33; 30 MHz — 30	Impulse generator output causes at least a 1dB rise in output meter noise indication.

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
3 (Cont'd)			

Tuning Unit	Frequency	Impulse Gen. Output Level (dB above 1 μV/MHz)
T-1/NF-105	20 MHz	32
	200 MHz	30
T-2/NF-105	200 MHz }	30
	400 MHz }	
T-3/NF-105	400 MHz }	30
	1000 MHz }	
T-A/NF-105/M-126	0.15 MHz	27
	30 MHz	23

4	To check voltmeter accuracy.	**Note** Perform the following procedure for all the frequencies indicated on the calibration chart furnished with each tuning unit. De-energize impulse generator and switch to output of signal generator via SU-105 Switching Unit. Set FUNCTION Selector switch to CARRIER and SIGNAL INPUT ATTENUATOR DB switch to 20.	Impulse generator output level agrees with that indicated on right-hand column of calibration chart supplied with the tuning unit(s).

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
4 (Cont'd)		Adjust output level of signal generator to 100 microvolts. Adjust IF GAIN control for full-scale deflection on basic unit output meter. Energize impulse generator and switch its output to basic unit. Set FUNCTION Selector switch to PEAK. Adjust impulse generator output level controls to obtain same full-scale reading on meter. Record impulse generator level settings at each frequency.	
5	To check accuracy of signal input attenuator.	De-energize impulse generator and switch to output of signal generator. Set Function Selector switch to CARRIER and SIGNAL INPUT ATTENUATOR DB switch to 80. Adjust output level of signal generator to 0.1 volt rms output. Adjust IF GAIN control for full-scale deflection on basic unit output meter. Increase attenuation of EMPIRE AT-103-B calibrated step attenuator in 20 dB steps, while decreasing attenuation of signal input attenuator (via SIGNAL INPUT ATTENUATOR DB switch) by corresponding amount to 20 dB.	Signal input produces exactly full-scale deflection and variation thereafter does not exceed 1 dB from step to step.
6	To check i-f and image frequency rejection.	a. Set EMPIRE AT-103-B calibrated step attenuator to 0 dB and Function Selector switch to CARRIER. Set SIGNAL INPUT ATTENUATOR DB switch to 0. Set signal generator and tuning unit to same frequency. Adjust output level of signal generator to 10 microvolts. Adjust IF GAIN control for full-scale deflection on output meter. Depending upon tuning unit in use, set frequency and output level controls on signal generator as indicated below. Observe indication on output meter for each frequency selected.	a. Output meter indicates less than full-scale deflection.

Tuning Unit	Signal Gen. Frequency	Signal Gen. Output Level
T-X/NF-105 and T-X/NF-105/M-126	225 kHz	32mV
T-A/NF-105 and T-A/NF-105/M-126	455 kHz 1600 kHz	2.5mV
T-1/NF-105 and T-1/NF-105/M-126	10.7 MHz	0.32mV

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
6 (Cont'd)		Tuning Unit / Signal Gen. Frequency / Signal Gen. Output Level T-2/NF-105 and T-2/NF-105/M-126 — 30 MHz — 0.56mV T-3/NF-105 and T-3/NF-105/M-126 — 42 MHz — 1.3mV b. Repeat step a, except set signal generator frequency and output level as indicated below. Tuning Unit / Signal Gen. Frequency / Signal Gen. Output Level T-X/NF-105 and T-X/NF-105/M-126 — Tuning Unit freq. + 450 kHz — 0.1V T-A/NF-105 and T-A/NF-105/M-126 — Tuning Unit freq. + 910 (Bands 1 and 3) kHz / Tuning Unit freq. + 3.2 MHz (Bands 2, 4, 5, 6) — 2.5mV T-1/NF-105 and T-1/NF-105/M-126 — Tuning Unit freq. + 21.4 MHz — 0.32mV T-2/NF-105 and T-2/NF-105/M-126 — Tuning Unit freq. + 60 MHz — 0.56mV T-3/NF-105 and T-3/NF-105/M-126 — Tuning Unit freq. + 84 MHz — 1.3mV	b. Same as step a.

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
7	To check spurious response rejection.	Set SIGNAL INPUT ATTENUATOR DB switch to 0. Set signal generator and tuning unit to lowest frequency of tuning unit. Adjust output level of signal generator to 10 microvolts. Adjust IF GAIN for full-scale deflection on output meter. Tune the signal generator to harmonics of the tuning unit frequency. At each harmonic, adjust the generator output as listed below and note the output meter indication. Tuning Unit — Signal Gen. Output Level T-X/NF-105 and T-X/NF-105/M-126 — 32mV T-A/NF-105 and T-A/NF-105/M-126 — 3.2mV T-1/NF-105 and T-1/NF-105/M-126 — 10mV T-2/NF-105 and T-2/NF-105/M-126 — 10mV T-3/NF-105 and T-3/NF-105/M-126 — 10mV	Output meter indicates less than full-scale deflection for all harmonics.
8	To check pre-If Output.	Set IF GAIN control fully counterclockwise and SIGNAL INPUT ATTENUATOR DB switch to 20. Connect a BNC Tee-connector with 50-ohm termination on one end to PRE-I.F. OUTPUT connector on tuning unit. Connect an oscilloscope to other end of Tee-connector. Adjust output level of signal generator to 0.1-volt (rms). Record peak-to-peak voltage observed on oscilloscope.	Tuning Unit — Pre-If Output (Nominal) T-X/NF-105 and T-X/NF-105/M-126 — 0.1V T-A/NF-105 — 1V T-1/NF-105 — 0.1V T-2/NF-105 — 8mV T-3/NF-105 — 10mV

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
8 (Cont'd)			Tuning Unit / Pre-If Output (Nominal) T-A/NF-105/M-126 — 2V T-1/NF-105/M-126 — 0.2V T-2/NF-105/M-126 — 16mV T-3/NF-105/M-126 — 20mV
9	To check post-If Output.	Set SIGNAL INPUT ATTENUATOR DB to 20. Adjust output level of signal generator to 10 microvolts. Adjust IF GAIN control for a full-scale deflection on Output meter. Connect a BNC Tee-connector with 50-ohm termination on one end to IF OUT connector on basic unit. Connect oscilloscope to other end of Tee-connector. Record peak-to-peak voltage observed on oscilloscope.	0.06 volts peak-to-peak (nominal).
10	To check X coordinate output.	Set TUNING control to low end of frequency band. Connect digital voltmeter between pins D(+) and F(-) of EXT METER RECORDER connector on basic unit. Adjust TUNING control from low end to high end of each band, while observing indication on voltmeter.	Digital voltmeter indicates from 0 to +10 volts as TUNING control is adjusted from low end to high end of each frequency band. (Low frequency stop: 0 to +0.3V; high frequency stop: +9.5 to +10.5V.)
11	To check audio output.	Set SIGNAL INPUT ATTENUATOR DB switch to 20 and VOLUME control fully clockwise. Set Function Selector switch to CARRIER. Adjust output level of signal generator to 10 microvolts; modulate output 30 percent with 1000-Hz signal. Adjust IF GAIN control for full-scale deflection on output meter. Connect 600-ohm resistor across phone plug. Insert plug into PHONES connector on basic unit and connect oscilloscope across resistor. Record peak-to-peak voltage observed on oscilloscope.	22 volts peak-to-peak (nominal).

(Cont'd)

TABLE 4-3. MINIMUM PERFORMANCE STANDARDS CHECKS (Cont'd)

Step	Purpose	Procedure	Acceptable Indication
12	To check video output.	Set SIGNAL INPUT ATTENUATOR DB switch to 20 and Function Selector switch to CARRIER. Adjust output level of signal generator to 10 microvolts; modulate output 40 percent with 1000-Hz signal. Adjust IF GAIN control for full-scale deflection on output meter. Connect a BNC Tee-connector with 3000-ohm termination on one end to VIDEO OUTPUT connector on basic unit. Connect oscilloscope to other end of Tee-connector. Record peak-to-peak voltage observed on oscilloscope.	4.5 volts peak-to-peak (nominal).

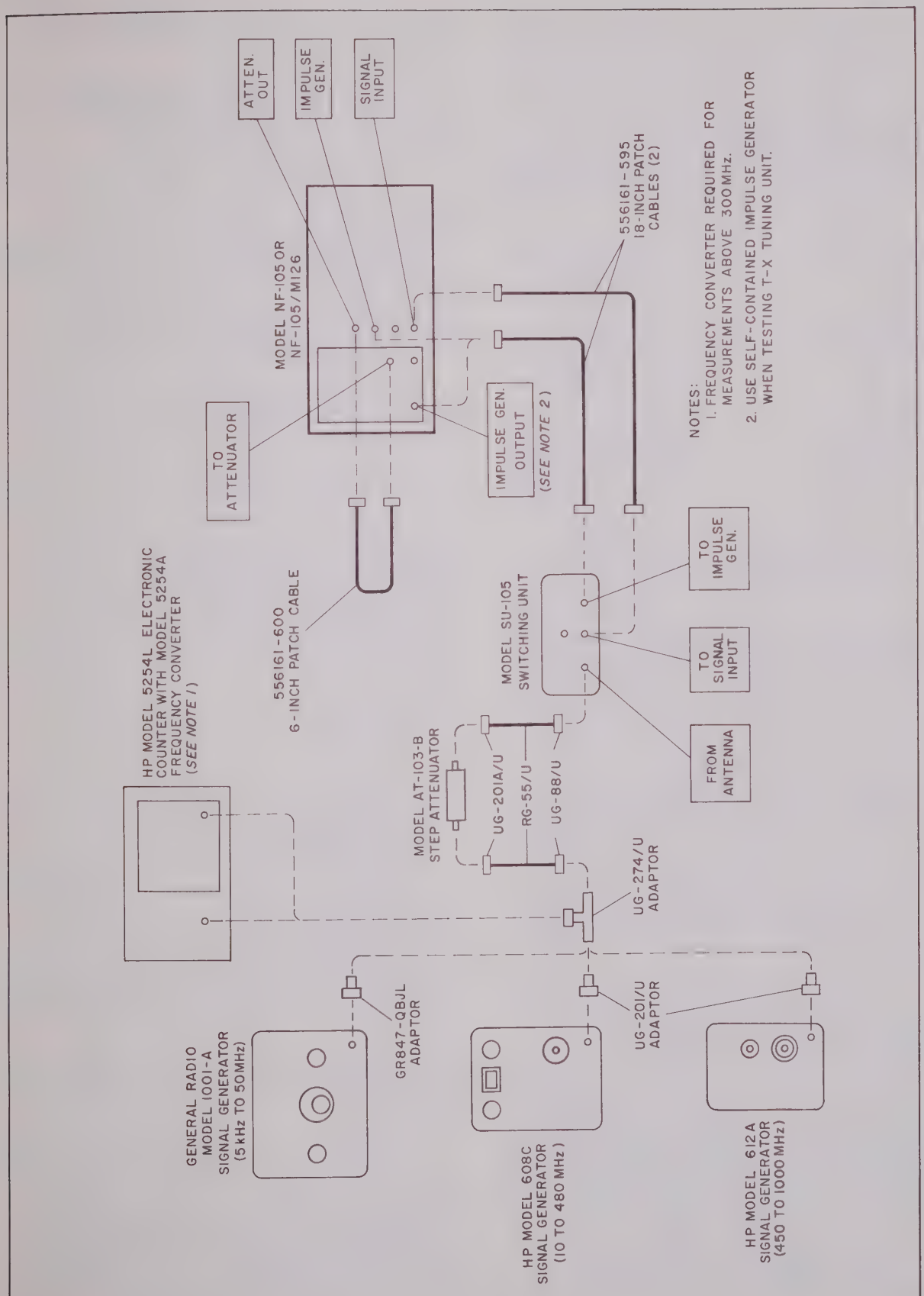


Figure 4-28. Equipment Setup for Minimum Performance Standards Checks

d. If the i-f output signal is abnormal, check the signal at the PRE-IF OUTPUT connector on the tuning unit in use with an oscilloscope. Connect a BNC Tee-connector with a 50-ohm termination on one end to the PRE-IF connector and connect the oscilloscope to the other end of the Tee-connector. With the SIGNAL INPUT ATTENUATOR DB switch set to 20, the following should be obtained at the PRE-IF OUTPUT connector of the various tuning units, with a 0.1-volt (rms) CW signal applied to the SIGNAL INPUT connector on the basic unit:

Tuning Unit	Pre-If Output (Peak-to-Peak)
T-A/NF-105	1 volt (nominal)
T-X/NF-105 and T-X/NF-105/M-126	0.1 volt (nominal)
T-1/NF-105	0.01 volt (nominal)
T-2/NF-105	8 millivolts (nominal)
T-3/NF-105	10 millivolts (nominal)
T-A/NF-105/M-126	2 volts (nominal)
T-1/NF-105/M-126	0.2 volt (nominal)
T-2/NF-105/M-126	16 millivolts (nominal)
T-3/NF-105/M-126	20 millivolts (nominal)

e. If the signal at the PRE-IF OUTPUT connector is normal, troubleshoot the i-f amplifier(s) in the particular tuning unit by signal tracing and voltage and resistance checks.

f. If the signal at the PRE-IF OUTPUT connector is abnormal, troubleshoot the front end of the tuning unit (r-f amplifier, local oscillator, and mixer) using signal tracing and/or voltage and resistance checks.

4-15. ABNORMAL METER INDICATION; AUDIO AND VIDEO INDICATIONS ARE NORMAL. An approach to this problem is as follows:

a. Connect an external meter to pins C(+) and E(-) of the EXT METER RECORDER connector on the basic unit. Set the METER switch to EXT; if a normal indication is obtained on the external meter, troubleshoot meter M1 and associated circuitry.

b. If the external meter also gives an abnormal indication, troubleshoot stages V18 and V21, and meter M1 and associated circuitry, using voltage and resistance checks.

4-16. ABNORMAL AUDIO INDICATION; METER AND VIDEO INDICATIONS ARE NORMAL. An approach to this problem is as follows:

a. Connect a 600-ohm resistor across a phone plug. Insert the plug into PHONES connector on the basic unit. Connect an oscilloscope across the 600-ohm resistor. Apply a 0.1-volt r-f signal (modulated 30 percent by a 1000-Hz signal) to the SIGNAL INPUT connector on the basic unit. Set the SIGNAL INPUT ATTENUATOR DB switch to 80 and adjust the IF GAIN control for a full-scale deflection on the output meter. (Function Selector in CARRIER position.)

b. If with the VOLUME control set maximum clockwise, a 22-volt peak-to-peak signal is not obtained on the oscilloscope, troubleshoot stages V19A and V20A, using signal tracing and voltage and resistance checks.

4-17. ABNORMAL VIDEO INDICATION; METER AND AUDIO INDICATIONS ARE NORMAL. An approach to this problem is as follows:

a. Connect a BNC Tee-connector with a 3000-ohm termination on one end to the VIDEO OUT connector on the basic unit. Connect an oscilloscope to the other end of the Tee-connector. Apply a 0.1-volt r-f signal (modulated 40 percent by a 1000-Hz signal) to the SIGNAL INPUT connector on the basic unit. Set the SIGNAL INPUT ATTENUATOR DB switch to 80 and adjust the IF GAIN control for a full-scale deflection on the output meter (Function Selector Switch in CARRIER position).

b. If a 4.5-volt peak-to-peak signal is not obtained on the oscilloscope, troubleshoot video detector CR4 and cathode follower V19B, using signal tracing and voltage and resistance checks.

4-18. POWER SUPPLY CHECK.

4-19. Improper operation of the Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters may be due to a malfunction within the power supply contained within the basic unit. To ascertain that the required voltages are being developed, proceed as directed in the following steps.

a. Remove the basic unit from its cabinet as described in paragraph 2-8.

b. Couple the basic unit to line power as described in paragraph 2-18.

c. Measure the power supply voltages present between points specified in table 4-8.

4-20. ALIGNMENT AND ADJUSTMENT PROCEDURES.

4-21. Paragraphs 4-22 through 4-45 contain the alignment and adjustment procedures for the basic unit and all tuning units. Unless otherwise specified, all front panel controls are to be adjusted as listed in table 2-2 prior to performing any of these procedures. These procedures assume that the power supply output level has been set in accordance with paragraph 4-22.

4-22. SETTING POWER SUPPLY OUTPUT LEVEL. To set the output level of the power supply, proceed as directed in the following steps.

a. With the basic unit withdrawn from its cabinet and a Model T-1/NF-105 or T-1/NF-105/M-126 Tuning Unit installed (if available), connect a vom across capacitor C195B and apply operating power to the equipment (through an autotransformer) as directed in paragraph 2-18. Rotate the IF GAIN control fully clockwise and allow the equipment to warm up for at least 15 minutes.

b. Adjust R70 to obtain a vom reading of +150 volts.

c. De-energize the equipment and connect the vom between pins 4 and 5 of V21 in the basic unit.

d. Re-energize the equipment and adjust R149 to obtain a vom reading of 5.8 volts ac.

e. De-energize and disconnect the equipment.

4-23. ADJUSTMENT OF IMPULSE GENERATOR. To adjust the impulse generator, proceed as directed in the following steps.

a. With the basic unit withdrawn from its cabinet (with or without a tuning unit installed) and the equipment unenergized, the IMPULSE GEN. FINE CONTACT ADJ. control set to mid-position, the IMPULSE GEN. PRE-ADJ screwdriver control set fully clockwise, energize the basic unit and allow a 15 minute warmup.

b. Plug a Model EA-105 Earphones into the PHONES receptacle and set the VOLUME control to mid-position.

c. While momentarily depressing the basic unit IMPULSE GEN. switch, adjust the IMPULSE GEN. PRE-ADJ. screwdriver control to obtain the sharpest aural indication of the nominally 2500-Hz impulse generator repetition rate in the headset. Adjust the VOLUME control to obtain a comfortable aural level. Release the IMPULSE GEN. switch after this adjustment has been performed.

d. Connect a frequency counter to the IMPULSE GEN. jack on the basic unit.

e. With the IMPULSE GEN. P.R.R. HZ switch set to X100, the IMPULSE GEN. P.R.R. HZ control set to 25, and the IMPULSE GEN. switch momentarily depressed, adjust trimmer C187 until the frequency counter indicates 2500 Hz. Release the IMPULSE GEN. switch after this adjustment has been performed.

f. Disconnect the frequency counter and check the accuracy of the impulse generator as follows:

(1) Deenergize the basic unit and set IMPULSE GEN. OUTPUT DBMHZ switch to 90.

(2) Measure the resistance from the center conductor to the shell of the IMPULSE GEN. jack on the basic unit with a vom. The measured resistance should be 10 ± 0.5 ohms.

(3) Re-energize the basic unit. Adjust the ADD TO IMPULSE GEN. OUTPUT control for a +7 DB indication on its associated meter.

(4) Measure the voltage across C207 (feedthrough capacitor located at the end of a pipe rising from the impulser at an angle of approximately 45 degrees) with the vom. The measured voltage should be +300 ±30 volts dc.

4-24. ADJUSTMENT OF X-COORDINATE OUTPUT. To set the X-coordinate output voltage on the various tuning units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the equipment de-energized, rotate the TUNING control fully clockwise and set the IF GAIN control fully clockwise.

b. Connect a digital voltmeter between pins D (+) and F (-) of the EXT. METER RECORDER connector.

c. Energize the basic unit and allow a 15 minute warmup.

d. Adjust the appropriate control, as listed in table 4-4, to obtain a digital voltmeter indication of +10 volts.

e. De-energize and disconnect the equipment.

4-25. ALIGNMENT OF MODELS T-X/NF-105 AND T-X/NF-105/M-126 TUNING UNITS. The alignment procedures for the i-f, r-f and bfo sections of these tuning units are detailed in paragraphs 4-26 through 4-28.

4-26. Alignment of 225-kHz I-f Amplifier. To align the 225-kHz i-f amplifier in the Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the equipment de-energized, disconnect coaxial plug P911 from its mating connector (J911) on the 225-kHz i-f amplifier.

b. With the SIGNAL INPUT ATTENUATOR DB switch set to 20 and the Function Selector switch set to CARRIER, set the IF GAIN control to mid-position and energize the equipment. Allow a 15 minute warmup.

c. Tune a signal generator to 225 kHz and adjust for minimum output level. Set the range selector switch to 14-25 and couple the signal generator to J911.

d. Increase the signal generator output level to obtain a half-scale output meter indication.

e. Adjust transformer T903 to obtain a maximum output meter indication. Reduce the signal generator output level, as required, to maintain an on-scale output meter indication.

f. Alternately adjust the bottom tuning slugs of Transformers T902, T901 and T900 to peak the output meter indication. Two peaks are obtained when adjusting these transformers; adjust for the first peak going in.

g. Alternately adjust the top tuning slugs of transformers T902, T901 and T900 to peak the output meter indication. Adjust for the first peak going in.

TABLE 4-4. X-COORDINATE OUTPUT CONTROLS

Tuning Unit	Control
T-X/NF-105 and T-X/NF-105/M-126	R992
T-A/NF-105 and T-A/NF-105/M-126	R772
T-1/NF-105 and T-1/NF-105/M-126	R283
T-2/NF-105 and T-2/NF-105/M-126	R41
T-3/NF-105 and T-3/NF-105/M-126	R661

h. Repeat steps e through g several times for optimum tuning of the 225-kHz i-f amplifier.

i. De-energize the basic unit, disconnect the signal generator and connect P911 to J911.

4-27. Alignment of 14- to 150-kHz Tuner. To align the 14- to 150-kHz tuner in the Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the alignment harness, the SIGNAL INPUT ATTENUATOR DB switch set to 80, the Function Selector switch set to CARRIER, the IF GAIN control set to mid-position and the frequency range switch set to 14-25, energize the basic unit and allow a four hour warmup.

b. Adjust the TUNING control to obtain a kHz dial indication of 14.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter, as illustrated in figure 4-28. Tune the signal generator to 14 kHz and adjust for an output level of approximately 0.1 volt rms.

d. Connect an 18-inch patch cable between the tuning unit TO ATTENUATOR jack and the basic unit ATTEN. OUTPUT jack.

e. Rotate the tuning slug of L940 fully counter-clockwise. Turn the slug clockwise for the first peak indication of the output meter. Adjust the IF GAIN control, as required, to maintain an on-scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L940 until the meter pointer drops downscale and repeat step e.

f. Adjust L911 and L924 to peak the output meter indication.

g. Adjust the TUNING control to obtain a kHz dial indication of 25. Tune the signal generator to 25 kHz and maintain its output level at 0.1 volt rms.

h. Adjust trimmer capacitor C941 to peak the output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust C941 until the pointer drops downscale and repeat step h.

i. Adjust trimmer capacitors C911 and C921 to peak the output meter indication.

j. Repeat steps e through i until optimum tuning is obtained at the low and high ends of the band.

k. Repeat the procedure of steps c through j for bands 2 and 3, adjusting the components listed in table 4-5 at the high and low ends of the appropriate

TABLE 4-5. ADJUSTMENTS FOR T-X/NF-105 AND T-X/NF-105/M-126 TUNER

Band	Set Frequency Range Switch to	Adjust TUNING Control for kHz Dial Indication of	Adjust to Peak Output Meter Indication
2	25-62	25 62	L941*, L913 and L923 C942**, C912 and C922
3	62-150	62 150	L942*, L912 and L922 C943**, C913 and C923

*Substitute for L940 in note following step e.
**Substitute for C941 in note following step h.

band when the signal generator is tuned to the frequency indicated on the kHz dial.

l. Disconnect the signal generator from the SIGNAL INPUT connector and disconnect the plug of the 18-inch patch cable that connects to the TO ATTEN. jack.

m. Connect a second 18-inch patch cable between the TO SIG. INPUT jack of the tuning unit and the SIGNAL INPUT jack on the basic unit.

n. Tune the signal generator to 14 kHz and adjust for an 8 microvolt output. Couple the signal generator to the TO ATTENUATOR jack on the tuning unit.

o. Set the frequency range switch to 14-25 and adjust the TUNING control to obtain a kHz dial indication of 14.

p. Rock the signal generator frequency control to obtain a maximum on-scale output meter indication. Adjust the IF GAIN control, if necessary, to maintain an on-scale meter indication. Reset the signal generator output level, if necessary, to 8 microvolts.

q. Disconnect the signal generator from the TO ATTENUATOR jack and, without adjusting any signal generator controls, couple the signal generator to the VERT. ANT. jack through a dummy antenna (see figure 4-29). Reconnect the 18-inch patch cable to the TO ATTEN. jack.

r. With the SIGNAL INPUT ATTENUATOR DB switch set to 0, adjust L904 to peak the output meter indication. Adjust the IF GAIN control, as required, to maintain an on-scale output meter indication.

s. Repeat step l and n through r with the TUNING control adjusted to obtain a kHz dial indication of 25, the signal generator tuned to 25 kHz and adjusting trimmer capacitor C901 instead of L904 to peak the output meter indication.

t. Repeat steps l through s for bands 2 and 3, adjusting the components listed in table 4-6 at the high and low ends of the appropriate band when the signal generator is tuned to the frequency indicated on the kHz dial.

u. De-energize the basic unit, disconnect the signal generator and disconnect the dummy antenna from the VERT. ANT. jack.

4-28. Adjustment of BFO. To adjust the beat frequency oscillator in the T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the alignment harness, the SIGNAL INPUT ATTENUATOR DB switch set to 80, the Function Selector switch set to CARRIER, the IF GAIN control set to mid-position and the range selector switch set to 62-150, energize the basic unit and allow a one hour warmup.

b. Adjust the TUNING control to obtain a kHz dial indication of 150.

c. Couple a signal generator to the SIGNAL INPUT jack and a counter (see figure 4-28). Tune the signal generator to 150 kHz and adjust for an output level of approximately 0.1 volt rms.

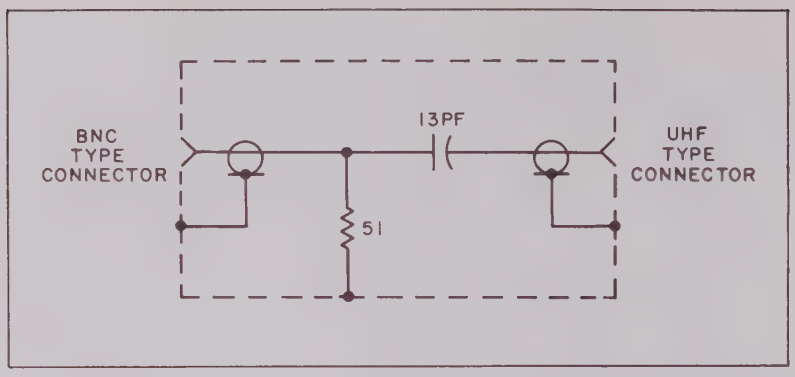


Figure 4-29. Dummy Antenna for Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units

TABLE 4-6. ADJUSTMENTS FOR T-X/NF-105 AND T-X/NF-105/M-126 ANTENNA TUNER

Band	Set Frequency Range Switch to	Adjust TUNING Control for kHz Dial Indication of	Adjust to Peak Output Meter Indication
2	25-62	25 62	L903 C902
3	62-150	62 150	L902 C903

d. Plug a Model EA-105 Earphones into the PHONES receptacle and set the VOLUME control to mid-position.

e. Set the BFO switch to ON and adjust L943 to obtain a null in the headset.

f. De-energize and disconnect the equipment.

4-29. ALIGNMENT OF MODELS T-A/NF-105 AND T-A/NF-105/M-126 TUNING UNITS. The alignment procedures for the i-f and r-f sections of these tuning units are detailed in paragraphs 4-30 and 4-31.

4-30. Alignment of 455- and 1600-kHz I-f Amplifiers (T-A/NF-105 and T-A/NF-105/M-126). To align the 455- and 1600-kHz i-f amplifiers of the Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the equipment de-energized, disconnect coaxial plug P705 from its mating connector (J705) on the 455-kHz i-f amplifier.

b. With the SIGNAL INPUT ATTENUATOR DB switch set to 20 and the Function Selector switch set to CARRIER, set the IF GAIN control to mid-position and energize the equipment. Allow a 15 minute warmup.

c. Tune a signal generator to 455-kHz and, with the range selector switch set to 0.87-2.1, adjust the signal generator for minimum output level and connect the generator to J705 through a 0.001-uf capacitor.

d. Increase the signal generator output level to obtain an output meter indication of approximately half scale.

e. Adjust transformer T707 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain a half-scale output meter indication.

Note

Several peaks are obtained when adjusting the bottom and top tuning slugs of transformers T706, T705, and T704 in steps f and g below. Adjust each transformer tuning slug for the first peak going in from maximum CCW.

f. Alternately adjust the bottom tuning slugs of transformers T706, T705 and T704 to peak the output meter indication. Repeat this step several time to obtain optimum response.

g. Alternately adjust the top tuning slugs of transformers T706, T705 and T704 to peak the output meter indication. Repeat this step several times until optimum response is obtained.

h. Adjust the signal generator for minimum output level and disconnect from J705. Connect P705 to J705.

i. Connect the signal generator to the TO ATTENUATOR jack and adjust the TUNING control to obtain an MHZ dial indication of 0.87.

j. Tune the signal generator to 0.87 MHz and adjust for an output level of 1 microvolt. Tune L701 to peak the output meter indication.

k. Disconnect coaxial plug P704 from its mating connector (J704) on the 1600-kHz i-f amplifier.

l. Tune the signal generator to 1600 kHz and, with the range selector switch set to 0.36-0.87, couple the signal generator to J704 through a 0.001-uf capacitor.

m. Increase the signal generator output level to obtain a half-scale indication on the output meter.

n. Tune transformer T703 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Several peaks are obtained when adjusting the bottom tuning slugs of transformers T702, T701, and T700 in step o below. Adjust each transformer tuning slug for the second peak going in from maximum CCW.

o. Alternately adjust the bottom tuning slugs of transformers T702, T701 and T700 to peak the output meter indication. Repeat this step several times until optimum response is obtained.

p. Alternately adjust the top tuning slugs of transformers T702, T701 and T700 to again peak the output meter indication. Repeat this step several times to obtain optimum response.

q. Adjust the signal generator for minimum output level and disconnect from J704. Connect P704 to J704.

r. Connect the signal generator to the TO ATTENUATOR jack and adjust the TUNING control to obtain an MHZ dial indication of 0.36.

s. Tune the signal generator to 0.36 MHz and adjust for an output level of 1 microvolt. Tune L700 to peak the output meter indication.

4-31. Alignment of 0.15- to 30-MHz Tuner (T-A/NF-105 and T-A/NF-105/M-126). To align the 0.15- to 30-MHz tuner in the Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Units, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the alignment harness, the SIGNAL INPUT ATTENUATOR DB switch set to 80, the Function Selector switch set to CARRIER, the IF GAIN control set to mid-position and the range selector switch set to 0.15-0.36, energize the basic unit and allow a one hour warmup.

b. Adjust the TUNING control to obtain an MHz dial indication of 0.15.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter, as illustrated in figure 4-29. Tune the generator to 0.15 MHz and adjust for an output level of approximately 0.1 volt rms.

d. Adjust transformers T708, T714 and T720 to peak the output meter indication. Adjust the IF GAIN control, as required, to maintain an on-scale output meter indication.

e. Adjust the TUNING control to obtain an MHz dial indication of 0.36. Tune the signal generator to 0.36 MHz and adjust its output level for approximately 0.1 volt rms.

f. Adjust capacitors C700, C722 and C738 to peak the output meter indication. Adjust the IF GAIN control, as required, to maintain an on-scale output meter indication.

g. Repeat steps b through f until optimum response is obtained.

h. Repeat the above procedure for the remaining frequency bands, adjusting the components listed in table 4-7.

4-32. ALIGNMENT OF MODEL T-1/NF-105 AND T-1/NF-105/M-126 TUNING UNITS. The alignment procedures for the i-f and r-f circuits of these tuning units are described in paragraphs 4-33 through 4-36.

4-33. Alignment of 10.7-MHz I-f Amplifier (T-1/NF-105). To align the 10.7-MHz i-f amplifier in the Model T-1/NF-105 Tuning Unit, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the basic unit un-energized, set the SIGNAL INPUT ATTENUATOR DB switch to 20, the Function Selector switch to CARRIER, the FREQUENCY RANGE

TABLE 4-7. ADJUSTMENTS FOR T-A/NF-105 AND T-A/NF-105/M-126 TUNER

Band	Set Frequency Range Switch to	Adjust TUNING Control for MHz Dial Indication of	Adjust to Peak Output Meter Indication
2	0.36- 0.87	0.36 0.87	T709, T715 and T721 C702, C724 and C740
3	0.87- 2.1	0.87 2.1	T710, T716 and T722 C704, C726 and C742
4	2.1 - 5.2	2.1 5.2	T711, T717 and T723 C706, C728 and C744
5	5.2 -12.7	5.2 12.7	T712, T718 and T724 C708, C730 and C750
6	12.7 -30	12.7 30	T713, T719 and T725 C710, C732 and C752

switch to 20-65 and the IF GAIN control to mid-position, energize the basic unit and allow a 15 minute warmup.

b. Tune a signal generator to exactly 10.7 MHz and adjust for minimum output level. Couple the signal generator between the grid (pin 2) of V10 and chassis ground and increase the signal generator output level to obtain an output meter indication of approximately half scale.

c. Alternately adjust transformers T5 and T7 through T9 and coil L46 to peak the output meter indication. Reduce the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L47 until the pointer drops downscale and repeat step c.

d. Adjust the signal generator for minimum output level and disconnect from the grid of V10. Couple the signal generator to the grid (pin 2) of V13.

e. Set the FREQUENCY RANGE switch to 65-200 and increase the signal generator output level to obtain an output meter indication of approximately half scale.

f. Tune transformer T6 to peak the output meter indication.

g. Adjust the signal generator for minimum output level, set the IF GAIN control fully clockwise and increase the signal level to obtain an output meter indication of approximately half scale.

h. Carefully bridge a 150-ohm resistor across the output meter terminals. The meter indication should drop downscale. Increase the signal generator output level until the i-f amplifier saturates. Note the signal generator output level; it should be approximately 0.1 volt rms. Adjust L47 to obtain a maximum output meter indication.

i. De-energize the basic unit, remove the 150-ohm resistor and disconnect the signal generator.

4-34. Alignment of 10.7-MHz I-f Amplifier (T-1/NF-105/M-126). To align the 10.7-MHz i-f amplifier in the Model T-1/NF-105/M-126 Tuning Unit, proceed as directed in steps a and b of paragraph 4-33 and then continue as directed in the following steps.

a. Alternately adjust transformers T5, T7, T8 and T9 and coils L1000, L1001 and L46 to peak the output meter indication. Reduce the signal generator output level, as required, to maintain an on scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L47 until the meter pointer drops downscale, and repeat step a.

b. Perform steps d through i of paragraph 4-33.

4-35. Alignment of 20- to 65-MHz Tuner (T-1/NF-105 and T-1/NF-105/M-126). To align the 20- to 65-MHz tuner in these tuning units, proceed as directed in the following steps.

a. With the tuning unit connected to the basic unit via the alignment harness, the Function Selector switch set to CARRIER, the SIGNAL INPUT ATTENUATOR DB switch set to 80 and the IF GAIN control set to mid-position, energize the equipment and allow a one hour warmup.

b. Set the FREQUENCY RANGE switch to 20-65 and adjust the TUNING control to obtain an MHz dial indication of 20.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency meter, as illustrated in figure 4-28. Tune the signal generator to 20 MHz and adjust for an output level of approximately 0.1 volt rms.

d. Carefully adjust local oscillator trimmer capacitor C84 to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain an on-scale output meter indication.

e. Alternately adjust r-f amplifier tuning capacitors C60, C67 and C79 to peak the output meter indication. Repeat this step several times until the ±2% dial accuracy is obtained.

f. Adjust the TUNING control to obtain an MHz dial indication of 65 and tune the signal generator to 65 MHz, maintaining an output level of approximately 0.1 volt rms. Rock the signal generator tuning control to obtain a maximum output meter indication. Note the reading of the frequency counter; it should be within ±2% of 65 MHz (between 63.7 and 66.3 MHz). If the counter indication is within these limits, proceed to step j. If the counter indication is outside these limits, continue to step g.

g. Tune the signal generator to 65 MHz and carefully spread or compress the turns on L26, as required, to obtain a maximum output meter indication.

h. Alternately tune coils L20, L22 and L24 to peak the output meter indication. Repeat this step several times until optimum response is obtained.

i. Repeat steps c through h until the specified dial accuracy is obtained at both the high and low ends of the band.

j. Disconnect the signal generator from the SIGNAL INPUT jack and couple the IMPULSE GEN. jack to the SIGNAL INPUT jack. Set the Function Selector switch to PEAK and energize the basic unit impulse generator. Adjust the IF GAIN control, if necessary, to obtain a mid-scale output meter indication.

k. Starting at the low end of the band, scan the 20- to 65-MHz band and note the frequencies which produce low output meter indications.

l. Rotate the TUNING control, in turn, to obtain the frequencies which produced the low output meter indications, while adjusting trimmer capacitors C67 and C79 on the lower portion of the band, and spreading or compressing the turns on coils L22 and L24 on the higher portion of the band to peak the output meter indication. Repeat this step until the difference between the output meter indication for the strongest and weakest point in the band is less than 10 dB.

m. Repeat step k, noting which frequency produces the lowest output meter indication. With the impulse generator still energized and the TUNING control adjusted to this frequency, adjust R50 (in the Model T-1/NF-105 Tuning Unit only) to obtain the same output meter indication as that obtained at the weakest point in the 65- to 200-MHz tuner.

n. Release the IMPULSE GEN. switch and de-energize the basic unit.

4-36. Alignment of 65- to 200-MHz Tuner (T-1/NF-105 and T-1/NF-105/M-126). To align the 65- to 200-MHz tuner in these tuning units, proceed as directed in the following steps.

a. With the tuning unit connected to the basic unit via the alignment harness, the Function Selector switch set to CARRIER, the SIGNAL INPUT ATTENUATOR DB switch set to 80 and the IF GAIN control set to mid-position, energize the equipment and allow a one hour warmup.

b. Set the FREQUENCY RANGE switch to 65-200 and adjust the TUNING control to obtain an MHz dial indication of 65.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter, as illustrated in figure 4-28. Tune the signal generator to 65 MHz and adjust for an output level of approximately 0.1 volt rms.

d. Carefully adjust local oscillator trimmer capacitor C117 to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain an on-scale output meter indication.

e. Alternately adjust r-f amplifier tuning capacitors C96, C101 and C109 to peak the output meter indication. Repeat this step several times until optimum response is obtained.

f. Adjust the TUNING control to obtain an MHz dial indication of 200 and tune the signal generator to 200 MHz, maintaining an output level of

approximately 0.1 volt rms. Rock the signal generator tuning control to obtain a maximum output meter indication. Note the reading of the frequency counter; it should be within ±2% of 200 MHz (between 196 and 204 MHz). If the counter indication is within these limits, proceed to step j. If the counter indication is outside these limits, continue to step g.

g. Tune the signal generator to 200 MHz and carefully spread or compress the turns on L42, as required, to obtain a maximum output meter indication.

h. Alternately tune coils L33, L36 and L39 to peak the output meter indication. Repeat this step several times until optimum response is obtained.

i. Repeat steps c through h until the specified dial accuracy is obtained at both the high and low ends of the band.

j. Disconnect the signal generator from the SIGNAL INPUT jack and couple the IMPULSE GEN. jack to the SIGNAL INPUT jack. Set the Function Selector switch to PEAK and energize the basic unit impulse generator. Adjust the IF GAIN control, if necessary, to obtain a mid-scale output meter indication.

k. Starting at the low end of the band, scan the 65- to 200-MHz band and note the frequencies which produce low output meter indications.

l. Rotate the TUNING control, in turn, to obtain the frequencies which produced the low output meter indications, while adjusting trimmer capacitors C101 and C109 on the lower portion of the band, and spreading or compressing the turns on coils L36 and L37 on the higher portion of the band to peak the output meter indication. Repeat this step until the difference between the output meter indication for the strongest and weakest point in the band is less than 10 dB.

m. Release the IMPULSE GEN. switch and de-energize the basic unit.

4-37. ALIGNMENT OF MODELS T-2/NF-105 AND T-2/NF-105/M-126 TUNING UNITS. The alignment procedures for the i-f and r-f sections of these tuning units are detailed in paragraphs 4-38 through 4-40.

4-38. Alignment of 30-MHz I-f Amplifier (T-2/NF-105). To align the 30-MHz i-f amplifier of the Model T-2/NF-105 Tuning Unit, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the equipment de-energized, disconnect coaxial plug P205 from its mating connector (J205) on the 200- to 400-MHz tuner.

b. With the SIGNAL INPUT ATTENUATOR DB switch set to 20 and the Function Selector switch set to CARRIER, set the IF GAIN control to mid-position and energize the equipment. Allow a 15 minute warmup.

c. Tune a signal generator to 30 MHz, adjust the signal generator for minimum output level and couple the generator to P205.

d. Increase the signal generator output level to obtain a mid-scale output meter indication.

e. Alternately tune transformers T1 through T3 and coils L62 and L11 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Should the output meter point deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L16 until the meter pointer drops downscale and repeat step e.

f. Disconnect the signal generator and connect P205 to J205.

g. Adjust the TUNING control to obtain an MHz dial indication of 200, adjust the signal generator for minimum output level at approximately 200 MHz and couple the signal generator to the SIGNAL INPUT jack.

h. Rock the signal generator tuning control, while increasing the generator output level, to obtain an output meter indication of approximately half-scale.

i. Alternately adjust C8 (on the 200- to 400-MHz tuner) and T1 (on the 30-MHz i-f amplifier) to peak the output meter indication.

j. Adjust the signal generator for minimum output level, de-energize the basic unit and disconnect the alignment harness from between the tuning unit and the basic unit. Remove the basic unit from its cabinet and install the tuning unit into the basic unit. Re-energize the equipment and allow a one hour warmup before proceeding to step k.

k. Rotate the IF GAIN control fully clockwise and adjust the signal generator output level to obtain an output meter indication of 20 on the upper DB scale.

l. Carefully bridge a 150-ohm resistor across the terminals of the output meter. The output meter indication should drop downscale. Increase the signal generator output level until the i-f amplifier saturates. Note the signal generator output level at which saturation occurs; it should be approximately 0.1 volt rms.

m. With the 150-ohm resistor still bridges across the output meter terminals, adjust L16 to peak the meter indication.

Note

Due to interaction between L16 and L11, it will be necessary to retune L11 (see step e) and L16 until optimum response is obtained.

n. De-energize the basic unit, remove the 150-ohm resistor and disconnect the signal generator.

4-39. Alignment of 30-MHz I-f Amplifier (T-2/NF-105/M-126). To align the 30-MHz i-f amplifier of the Model T-2/NF-105/M-126 Tuning Unit, proceed as directed in steps a through d of paragraph 4-38 and then continue as directed in the following steps.

a. Alternately adjust coils L901, L903, L907, L908, L62, L11 and transformer T900 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L16 until the meter pointer drops downscale and repeat step a.

b. De-energize the basic unit and unsolder the filament leads of V3.

c. Re-energize the basic unit and increase the signal generator output level to obtain an output meter indication of approximately half-scale.

d. Adjust L902 to obtain a minimum output meter indication. (Note that several minimum indications will be obtained as L902 is adjusted. Adjust L902 for the lowest of these indications.)

e. De-energize the basic unit and solder the filament leads to V3.

f. Perform steps f through h of paragraph 4-38.

g. Alternately adjust C8 (on the 200- to 400-MHz tuner) and L901 (on the 30-MHz i-f amplifier) to peak the output meter indication.

h. Perform steps j through n of paragraph 4-38.

4-40. Alignment of 200- to 400-MHz Tuner (T-2/NF-105 and T-2/NF-105/M-126). To align the 200- to 400-MHz tuner in these tuning units, proceed as directed in the following steps.

a. With the tuning unit connected to the basic unit via the alignment harness, the Function Selector switch set to CARRIER, the SIGNAL INPUT ATTENUATOR DB switch set to 80 and the IF GAIN control set to mid-position, energize the equipment and allow a one hour warmup.

b. Adjust the TUNING control to obtain an MHz dial indication of 400.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter (see figure 4-28). Tune the signal generator to 400 MHz and adjust for an output level of 0.1 volt rms.

d. Carefully adjust local oscillator trimmer capacitor C11 to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain an on-scale output meter indication.

e. Adjust r-f amplifier tuning capacitors C2 and C20 to peak the output meter indication. Repeat this step several times until the ±2% dial accuracy is obtained.

f. Adjust the TUNING control to obtain an MHz dial indication of 200 and tune the signal generator to 200 MHz, maintaining an output level of 0.1 volt rms.

g. Rock the signal generator tuning control to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain an on-scale indication. Note the reading of the frequency counter; it should be within ±2% of 200 MHz (between 196 and 204 MHz). If the counter indication is within these limits proceed to step j. If the counter indication is outside these limits, continue to step h.

h. Remove the cover plate from the 200- to 400-MHz tuner. Loosen the nut that holds coil L5 and carefully move coil L5 until a maximum output meter indication is obtained. Tighten the nut after making this adjustment and replace the cover on the tuner.

Note

Exercise extreme care in the adjustment of the local oscillator and r-f amplifier tuning coils. Very slight changes in coil positions will cause relatively large frequency changes.

i. Rock the signal generator tuning control to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain a half-scale indication.

j. Remove the cover plate from the 200- to 400-MHz tuner and insert the brass end of a Walsco 2540 tuning wand beside coil L2. If an increased meter indication is obtained, remove the tuning wand and loosen the screw on L2 and separate L2 from L1 until a maximum output meter indication is obtained. Insert the powdered iron end of the tuning wand beside coil L2. If an increased meter indication is obtained, remove the tuning wand and move L2 closer to L1 until a maximum output meter indication is obtained. Repeat this step until no further increase is noted on the output meter with brass end or powdered end of the tuning wand inserted. Secure the coil in this position.

k. Insert the brass end of the tuning wand beside coil L3. If an increased meter indication is obtained, remove the tuning wand and loosen the two nuts on L3 and separate L3 from L4 until a maximum meter indication is obtained. Insert the powdered iron end of the tuning wand beside coil L3. If an increased meter indication is obtained, remove the tuning wand and move L3 closer to L4 until a maximum output

meter indication is obtained. Repeat this step until no further increase is noted with the powdered iron end or brass end of the tuning wand inserted. Secure the coil in this position.

l. Disconnect the signal generator from the SIGNAL INPUT jack and couple the IMPULSE GEN. jack to the SIGNAL INPUT jack. Set the Function Selector switch to PEAK and energize the basic unit impulse generator. Adjust the IF GAIN control, if necessary, to obtain a mid-scale output meter indication.

m. Starting at the high end of the band, scan the 200 to 400 MHz band and note the frequencies which produce low output meter indications.

n. With the TUNING control adjusted, in turn, to obtain the frequencies which produced the low output meter indications, place the brass end of the tuning wand beside L2 and then beside L3. If the meter indication increases, remove the wand and bend the meshed rotor plates of C3 and C5, respectively, away from the stator plates until a maximum output meter indication is obtained. Insert the powdered iron end of the tuning wand beside L2 and then beside L3. If the output meter indication increases, remove the tuning wand and bend the meshed rotor plates of C3 and C5, respectively, until a maximum output meter indication is obtained.

o. Repeat step m, noting the frequency which produces the lowest output meter indication.

p. With the impulse generator still energized and the TUNING control adjusted to obtain the frequency noted in step o, adjust C8 to peak the output meter indication.

q. Release the IMPULSE GEN. switch and de-energize the equipment. Replace the tuner cover plate.

4-41. ALIGNMENT OF MODELS T-3/NF-105 AND T-3/NF-105/M-126 TUNING UNITS. The alignment procedures for the i-f and r-f sections of these tuning units are detailed in paragraphs 4-42 through 4-45.

4-42. Alignment of 42-MHz I-f Amplifier (T-3/NF-105). To align the 42-MHz i-f amplifier of the Model T-3/NF-105 Tuning Unit, proceed as directed in the following steps.

a. With the tuning unit coupled to the basic unit via the Model AH-105 Alignment Harness and the equipment de-energized, disconnect coaxial plug P610 from its mating connector (J610) on the 42-MHz i-f amplifier.

b. With the SIGNAL INPUT ATTENUATOR DB switch set to 20 and the Function Selector switch set to CARRIER, set the IF GAIN control to mid-position and energize the equipment. Allow a 15 minute warmup.

c. Tune a signal generator to 42 MHz and, with the tuning unit FREQUENCY RANGE switch set to the 400-700 MHz position, adjust the signal generator for minimum output level and connect to J610.

d. Increase the signal generator output level to obtain a mid-scale output meter indication.

e. Alternately adjust coils L619, and L623 through L624 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and adjustment of the signal generator output level does not bring the pointer down-scale, adjust L628 until the meter pointer drops down-scale and repeat steps d and e.

f. Disconnect the signal generator from J610 and connect P610 to J610.

g. Adjust the TUNING control to obtain a MHz dial indication of 400, adjust the signal generator for minimum output level at approximately 400 MHz and couple the signal generator to the SIGNAL INPUT jack.

h. Rock the signal generator tuning control about 400 MHz, while increasing the output level, to obtain meter indication of approximately half scale.

i. Adjust L619 to peak the output meter indication.

j. Adjust the signal generator for minimum output level, de-energize the basic unit and disconnect the alignment harness from between the tuning unit and the basic unit. Remove the basic unit from its cabinet and install the tuning unit into the basic unit. Re-energize the equipment and allow a one-hour warmup before proceeding to step k.

k. Rotate the IF GAIN control fully clockwise and adjust the signal generator output level to obtain an output meter indication of 20 on the upper DB scale.

l. Carefully bridge a 150-ohm resistor across the terminals of the output meter. The output meter indication should drop downscale. Increase the signal generator output level to once again obtain an on-scale output meter indication. Continue increasing the signal generator output level until the i-f amplifier saturates. Note the signal generator output level; it should be approximately 0.1 volt rms.

m. With the 150-ohm resistor still bridged between the output meter terminals, adjust L628 to peak the meter indication.

n. De-energize the basic unit, remove the 150-ohm resistor and disconnect the signal generator.

4-43. Alignment of 42-MHz I-f Amplifier (T-3/NF-105/M-126). To align the 42-MHz i-f

amplifier of the Model T-3/NF-105/M-126 Tuning Unit, proceed as directed in steps a through d of paragraph 4-42 and then continue as directed in the following steps.

a. Alternately adjust coils L619, L911 through L914 and L925 through L927 to peak the output meter indication. Adjust the signal generator output level, as required, to maintain an on-scale output meter indication.

Note

Should the output meter pointer deflect near or above a full-scale indication and reduction of the signal generator output level does not bring the pointer downscale, adjust L628 until the meter pointer drops downscale and repeat step a.

b. De-energize the basic unit and unsolder the filament leads of V605.

c. Re-energize the basic unit and increase the signal generator output level to obtain an output meter indication of approximately half scale.

d. Adjust L910 to obtain a minimum output meter indication. (Note that several minimum indications will be obtained as L910 as adjusted. Adjust L910 for the lowest of these indications.)

e. De-energize the basic unit and solder the filament leads to V905.

f. Re-energize the basic unit and perform steps f through n of paragraph 4-42.

4-44. Alignment of 400- to 700-MHz Tuner (T-3/NF-105 and T-3/NF-105/M-126). To align the 400- to 700-MHz tuner in these tuning units, proceed as directed in the following steps.

Note

Because of the critical nature of this alignment procedure, it is strongly recommended that the user return the instrument to the factory should this tuner require alignment.

a. With the tuning unit connected to the basic unit via the alignment harness, the SIGNAL INPUT ATTENUATOR DB switch set to 80, the Function Selector switch set to CARRIER, the IF GAIN control set to mid-position and the FREQUENCY RANGE switch set to 400-700 MHZ, energize the equipment and allow a one hour warmup.

b. Adjust the TUNING control to obtain an MHZ dial indication of 700.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter (see figure 4-28). Tune the signal generator to 700 MHZ, and adjust for an output level of 0.1 volt rms.

d. Rock the signal generator tuning control about 700 MHz to obtain a maximum output meter indication. Adjust the setting of the IF GAIN control, if necessary, to maintain an on-scale indication. Note the reading of the frequency counter; it should be within ±1% of 700 MHz (between 693 and 707 MHz). If the counter indication is within these limits, proceed to step f. If the counter indication is outside these limits, continue to step e.

e. Prepare a frequency error chart or select a 6T4 to obtain proper dial accuracy. If these two alternatives are not acceptable, adjust the signal generator frequency to obtain a counter reading corresponding to 700 MHz. If the frequency counter indication of step d was below 693 MHz, remove the angled plate that covers the side and part of the top of the tuner. Carefully spread apart the conductors of local oscillator tuning line L653 (see figure 4-30) until a maximum output meter indication is obtained. If the frequency counter indication of step d was above 707 MHz, carefully squeeze the conductors of local oscillator tuning line L653 together until a maximum output meter indication is obtained.

f. Check the dial accuracy throughout the remainder of the 400 to 700 MHz band. Should the signal generator frequency differ by more than ±1% from the MHz dial indication, adjust L653 (refer to step e) to compensate for the error.

Note

If the MHz dial accuracy specification of ±1% cannot be obtained by performing the steps of this procedure, return the instrument to the factory. (See the instructions on the WARRANTY page.)

g. Repeat step b and adjust the signal generator frequency to obtain a maximum output meter indication.

h. Carefully adjust trimmer capacitors C631, C632 and C633 (see figure 4-31) to peak the output meter indication. Repeat this step several times until optimum response is obtained.

i. De-energize the basic unit, disconnect the alignment harness from between the tuning unit and the basic unit, install the tuning unit into the basic unit and re-energize the equipment.

j. Adjust the signal generator for minimum output level at 700 MHz and set the SIGNAL INPUT ATTENUATOR DB switch to 0.

k. With the TUNING control set to obtain a MHz dial indication of 700, adjust the signal generator for an output of 10 microvolts and rock the signal generator tuning control to obtain a maximum output meter indication. Reset the signal generator level, if necessary, for 10 microvolts.

l. Adjust the IF GAIN control to obtain an output meter indication of 20 on the lower DB scale.

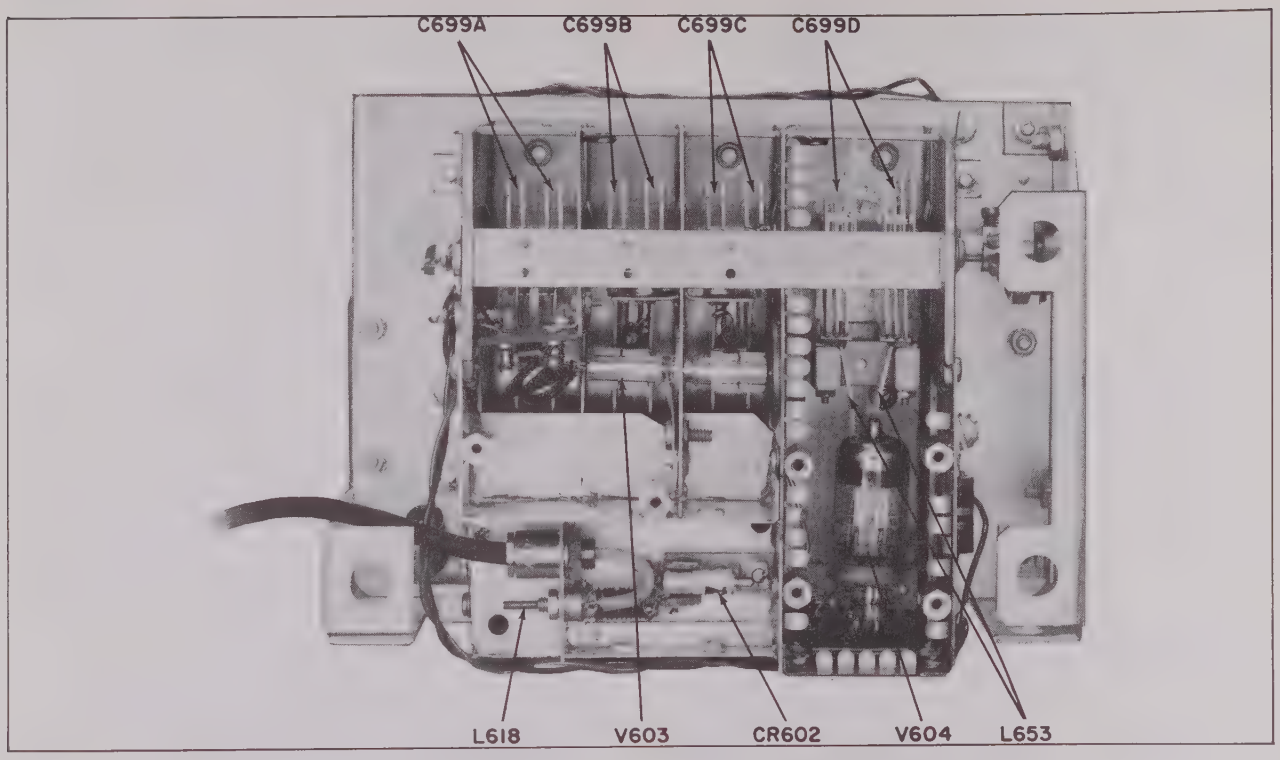


Figure 4-30. Top View of 400- to 700-MHz Tuner (Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units)

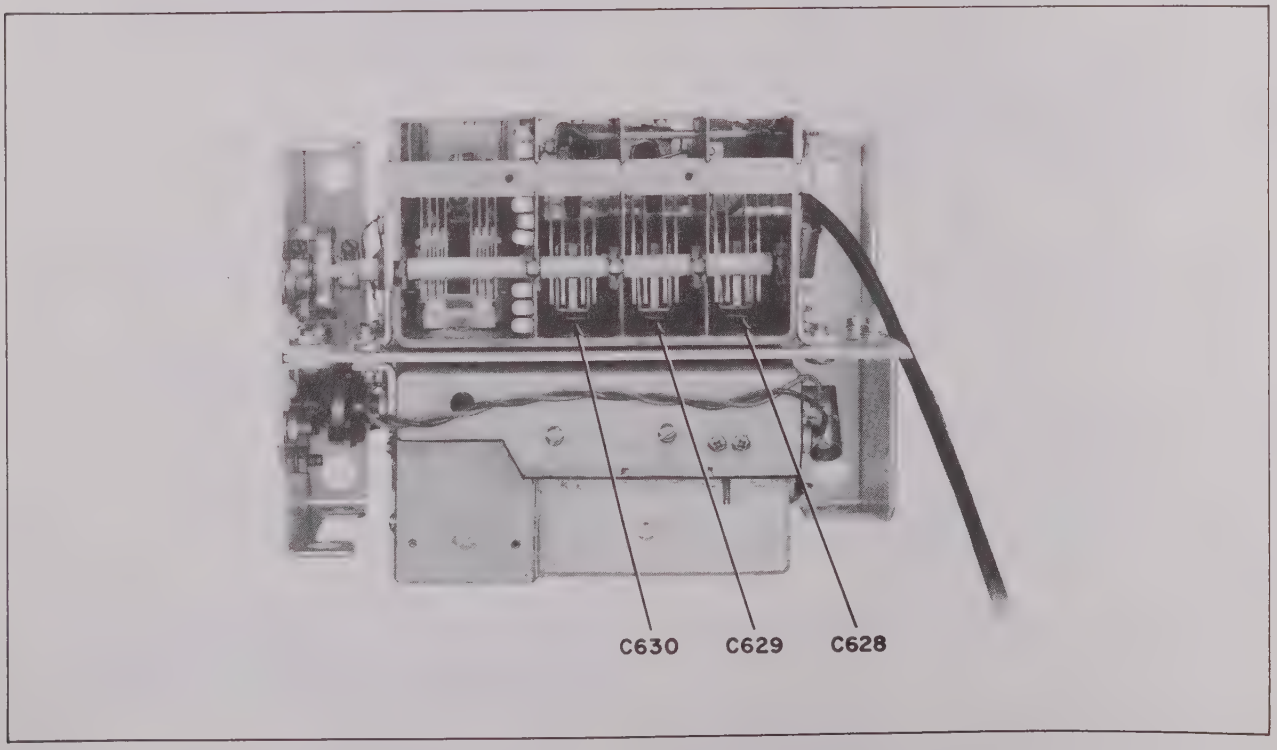


Figure 4-31. Side View of 400- to 700-MHz Tuner (Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units)

m. Disconnect the signal generator from the SIGNAL INPUT jack and note the noise level indication on the lower MICROVOLTS scale of the output meter. If the noise level exceeds 5 microvolts, replace r-f amplifier V603 and/or crystal mixer CR602 and repeat step h.

n. Set the SIGNAL INPUT ATTENUATOR DB switch to 20 and adjust the signal generator for a 50 microvolt output. Rotate the IF GAIN control clockwise until the output meter pointer deflects to an off-scale indication. If the off-scale indication cannot be obtained, replace r-f amplifier V603 and/or crystal mixer CR602 and repeat step h.

o. De-energize the equipment and couple the tuning unit to the basic unit via the alignment harness.

p. Set the SIGNAL INPUT ATTENUATOR DB switch to 20 and adjust the signal generator for minimum output level at 650 MHz. Re-energize the basic unit and allow 15 minutes for warmup.

q. With the TUNING control adjusted to obtain a MHz dial indication of 650, increase the signal generator output level to approximately 100 microvolts and adjust the IF GAIN control to obtain an output meter indication of 10 on the upper DB scale.

r. Rock the signal generator tuning control to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain a half-scale meter indication.

s. Insert the brass wand (see figure 4-32) fully into the tuner (see figure 4-33). Rotate the wand so that its hook contacts tuning line L648 and the shaft contacts the wall of the tuner. Note the output meter indication. Slowly withdraw the wand, while noting the output meter indication, until the wand is completely withdrawn.

t. If the meter indication increased as the wand was being withdrawn, the meshed rotor plates of capacitor C699 must be bent away from their appropriate stator plates to obtain a maximum output meter indication.

u. Repeat steps s and t for tuning lines L649 and L650 (and their respective tuning capacitors).

v. Note the output meter indication. Insert the fiber wand (see figure 4-32) into the tuner in the same manner as the brass wand was inserted. Note the output meter indication as the wand is inserted. Remove the wand.

w. If the meter indication increased when the fiber wand was inserted, the meshed rotor plates of capacitor C699 must be bent closer to their appropriate stator plates to obtain a maximum output meter indication.

x. Repeat steps q through w, in 50-MHz increments, for MHz dial indications down to 400.

y. Repeat steps h through x until optimum tuning is achieved.

z. Disconnect the signal generator from the SIGNAL INPUT jack and couple the IMPULSE GEN. jack to the SIGNAL INPUT jack.

aa. Set the Function Selector switch to PEAK and energize the basic unit impulse generator. Adjust the IF GAIN control, if necessary, to obtain a mid-scale output meter indication.

ab. While the impulse generator is operative, scan the 400- to 700-MHz band and note the frequency which produces the lowest indication.

ac. With the TUNING control adjusted to that frequency which produced the lowest output meter indication (see step ab) and the impulse generator still energized, adjust L618 (see figure 4-30) to peak the output meter indication.

ad. Release the IMPULSE GEN. switch and de-energize the equipment.

4-45. Alignment of 700- to 1000-MHz Tuner (T-3/NF-105 and T-3/NF-105/M-126). To align the 700- to 1000-MHz tuner in these tuning units, proceed as directed in the following steps.

Note

Because of the critical nature of this alignment procedure, it is strongly recommended that the user return the instrument to the factory should this tuner require alignment.

a. With the tuning unit connected to the basic unit via the alignment harness, the SIGNAL INPUT ATTENUATOR DB switch set to 80, the Function Selector switch set to CARRIER, the IF GAIN control set to mid-position and the FREQUENCY RANGE switch set to 700-1000, energize the equipment and allow a one hour warmup.

b. Adjust the TUNING control to obtain an MHz dial indication of 1000.

c. Couple a signal generator to both the SIGNAL INPUT jack and a frequency counter (see figure 4-28). Tune the signal generator to 1000 MHz and adjust for an output level of 0.1 volt rms.

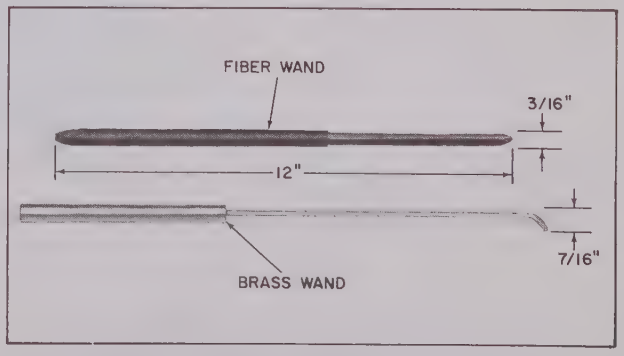


Figure 4-32. Alignment Wands for Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units

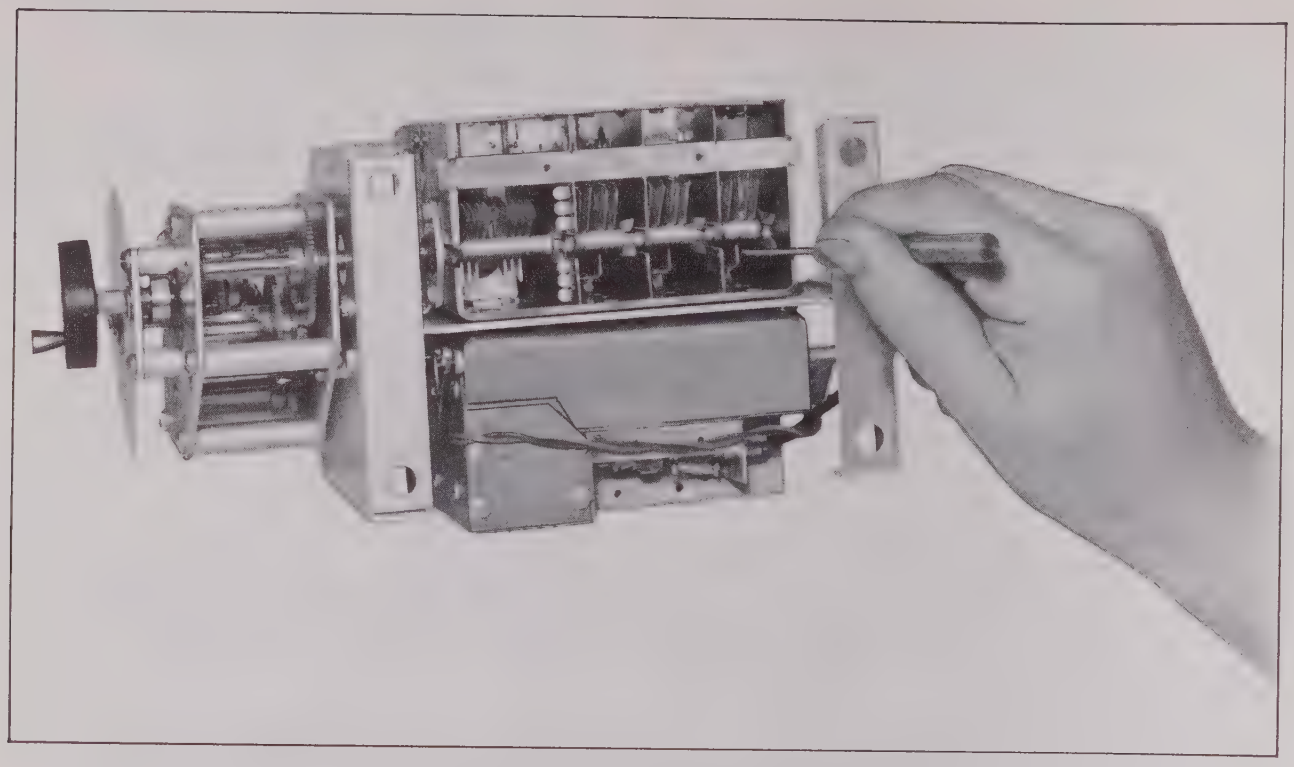


Figure 4-33. Proper Insertion of Alignment Wand

d. Rock the signal generator tuning control about 1000 MHz to obtain a maximum output meter indication. Adjust the setting of the IF GAIN control, if necessary, to maintain an on-scale indication. Note the reading of the frequency counter; it should be within ±1% of 1000 MHz (between 990 and 1010 MHz). If the counter indication is within these limits, proceed to step f. If the counter indication is outside these limits, continue to step e.

e. Prepare a frequency error chart or select a 6F4 to obtain proper dial accuracy. If these two alternatives are not acceptable, adjust the signal generator frequency to obtain a counter reading corresponding to 1000 MHz. Remove the plate that covers V601 and V602. Loosen the two hexagonal nuts (see figure 4-34) that secure V602 and carefully position the acorn tube to obtain a maximum output meter indication. Tighten the two nuts to lock the tube in this position. Replace the plate over V601 and V602 and check dial accuracy. Repeat this step as necessary to obtain maximum output meter indication with plate in place.

f. Check the dial accuracy throughout the remainder of the 700 to 1000 MHz band. Should the signal generator frequency differ by more than ±1% from the MHz dial indication, position V602 (refer to step e) to compensate for the error.

Note

If the MHz dial accuracy specification of ±1% cannot be obtained by performing the steps of this procedure, return the instrument to the factory. (See the instructions on the WARRANTY page.)

g. Repeat step b and adjust the signal generator frequency to obtain a maximum output meter indication.

h. Carefully adjust trimmer capacitors C628, C629 and C630 (see figure 4-35) to peak the output meter indication. Repeat this step several times until optimum response is obtained.

i. De-energize the basic unit, disconnect the alignment harness from between the tuning unit and the basic unit, install the tuning unit into the basic unit and re-energize the equipment.

j. Adjust the signal generator for minimum output level at 1000 MHz and set the SIGNAL INPUT ATTENUATOR DB switch to 0.

k. With the TUNING control set to obtain a MHz dial indication of 1000, adjust the signal generator for an output of 10 microvolts and rock the signal generator tuning control to obtain a maximum output meter indication. Reset the signal generator level, if necessary, for 10 microvolts.

l. Adjust the IF GAIN control to obtain an output meter indication of 20 on the lower DB scale.

m. Disconnect the signal generator from the SIGNAL INPUT jack and note the noise level indication on the lower MICROVOLTS scale of the output meter. If the noise level exceeds 5 microvolts, replace r-f amplifier V601 and/or crystal mixer CR601 and repeat step h.

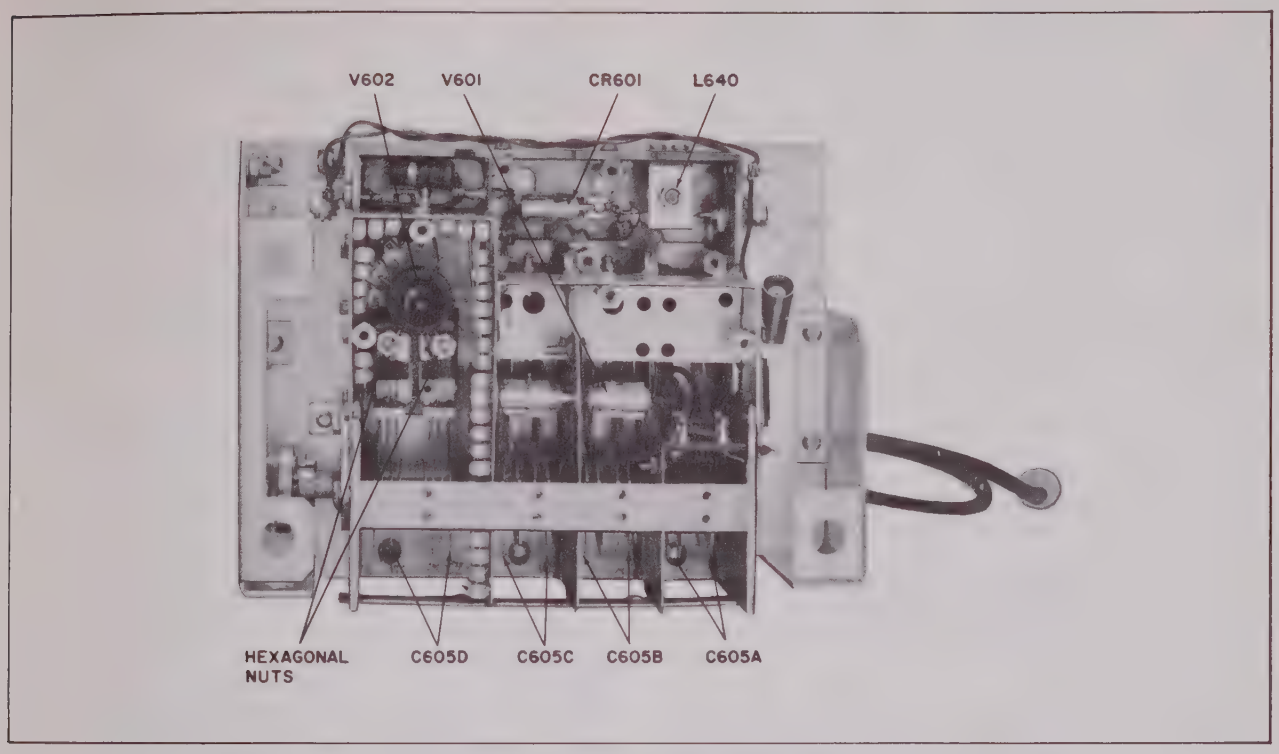


Figure 4-34. Top View of 700- to 1000-MHz Tuner (Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units)

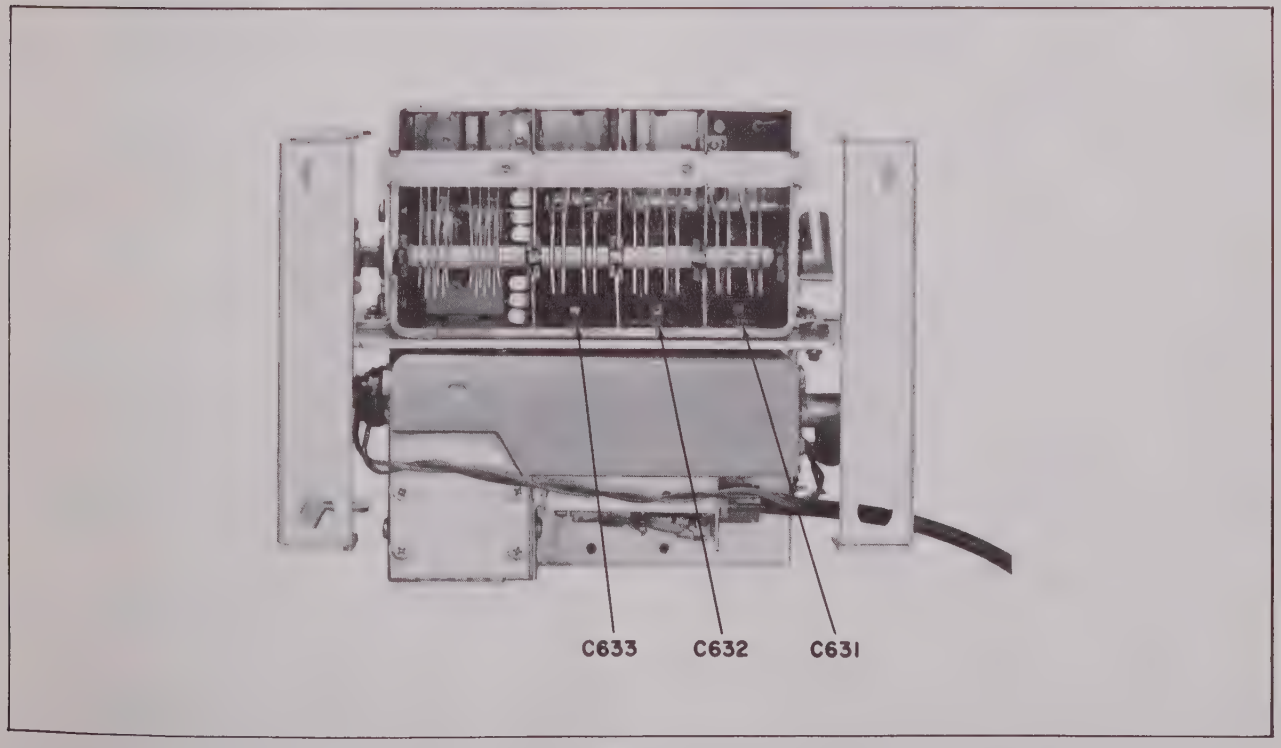


Figure 4-35. Side View of 700- to 1000-MHz Tuner (Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Units)

n. Set the SIGNAL INPUT ATTENUATOR DB switch to 20 and adjust the signal generator for a 50 microvolt output. Rotate the IF GAIN control clockwise until the output meter pointer deflects to an off-scale indication. If the off-scale indication cannot be obtained, replace r-f amplifier V601 and/or crystal mixer CR601 and repeat step h.

o. De-energize the equipment and couple the tuning unit to the basic unit via the alignment harness.

p. With the SIGNAL INPUT ATTENUATOR DB switch set to 20, adjust the signal generator for minimum output level at 950 MHz. Re-energize the basic unit and allow 15 minutes for warmup.

q. With the TUNING control adjusted to obtain an MHz dial indication of 950, increase the signal generator output level to approximately 100 microvolts and adjust the IF GAIN control to obtain an output meter indication of 10 on the upper DB scale.

r. Rock the signal generator tuning control to obtain a maximum output meter indication. Adjust the IF GAIN control, if necessary, to maintain a half-scale meter indication.

s. Remove the angled plate that covers the side and part of the top of the tuner. Insert the brass wand (see figure 4-32) fully into the tuner (see figure 4-33). Rotate the wand so that its hook contacts tuning line L641 and the shaft contacts the wall of the tuner. Note the output meter indication. Slowly withdraw the wand, while noting the output meter indication, until the wand is completely removed.

t. If the meter indication increased as the wand was being withdrawn, the meshed rotor plates of capacitor C605 must be bent away from their appropriate stator plates to obtain a maximum output meter indication.

u. Repeat steps s and t for tuning lines L644 and L645 (and their respective tuning capacitors).

v. Note the output meter indication. Insert the fiber wand (see figure 4-32) into the tuner in the same manner as the brass wand was inserted. Note the output meter indication as the wand is inserted. Remove the wand.

w. If the meter indication increased when the fiber wand was inserted, the meshed rotor plates of capacitor C605 must be closer to their appropriate stator plates to obtain a maximum output meter indication.

x. Repeat steps q through w, in 50-MHz increments, for MHz dial indications down to 700.

y. Repeat steps h through x until optimum tuning is achieved.

z. Disconnect the signal generator from the SIGNAL INPUT jack and couple the IMPULSE GEN. jack to the SIGNAL INPUT jack.

aa. Set the Function Selector switch to PEAK and energize the basic unit impulse generator. Adjust the IF GAIN control, if necessary, to obtain a mid-scale output meter indication.

ab. While the impulse generator is operative, scan the 700- to 1000-MHz band and note the frequency which produces the lowest output meter indication.

ac. With the TUNING control adjusted to that frequency which produced the lowest output meter indication (see step ab) and the impulse generator still energized, adjust L640 (see figure 4-34) to peak the output meter indication.

ad. Release the IMPULSE GEN. switch and de-energize the equipment.

4-46. REVISING TUNING UNIT CALIBRATION CHARTS.

4-47. If the tuning unit has been re-aligned, new calibration data must be taken for inclusion into the appropriate calibration chart (see tables 2-7 through 2-16). Similarly, if the basic unit impulse generator has been modified in any way, new calibration chart data must be taken for all tuning units other than the Model T-X/NF-105 and T-X/NF-105/M-126 Tuning Units. The procedure for obtaining this data is described in the following steps.

a. Energize the equipment as detailed in paragraphs 2-16 through 2-19.

b. Set the Model SU-105 Switching Unit switch to CALIBRATE and connect the equipment as illustrated in figure 4-36.

c. Adjust the TUNING control to obtain a kHz or MHz dial indication corresponding to the low frequency end of the band, set the Function Selector switch to CARRIER, and set the SIGNAL INPUT ATTENUATOR DB switch to 20.

d. Adjust the signal generator for minimum output level at a frequency corresponding to the low frequency end of the band of the tuning unit installed.

e. Set the Model SU-105 Switching Unit switch to READ and increase the signal generator output level to approximately 100 microvolts. Adjust the IF GAIN control, if necessary, to maintain an on-scale output meter indication. Rock the signal generator tuning control to obtain a maximum output meter indication and then set the generator output level at exactly 100 microvolts.

f. Adjust the IF GAIN control to obtain an output meter indication of exactly 20 on the DB scale.

g. Set the Function Selector switch to PEAK, set the Model SU-105 Switching Unit switch to CALIBRATE, and, if a Model T-1/NF-105/M-126, T-2/NF-105/M-126 or T-3/NF-105/M-126 Tuning Unit is installed, set the SIGNAL INPUT ATTENUATOR DB switch to 0.

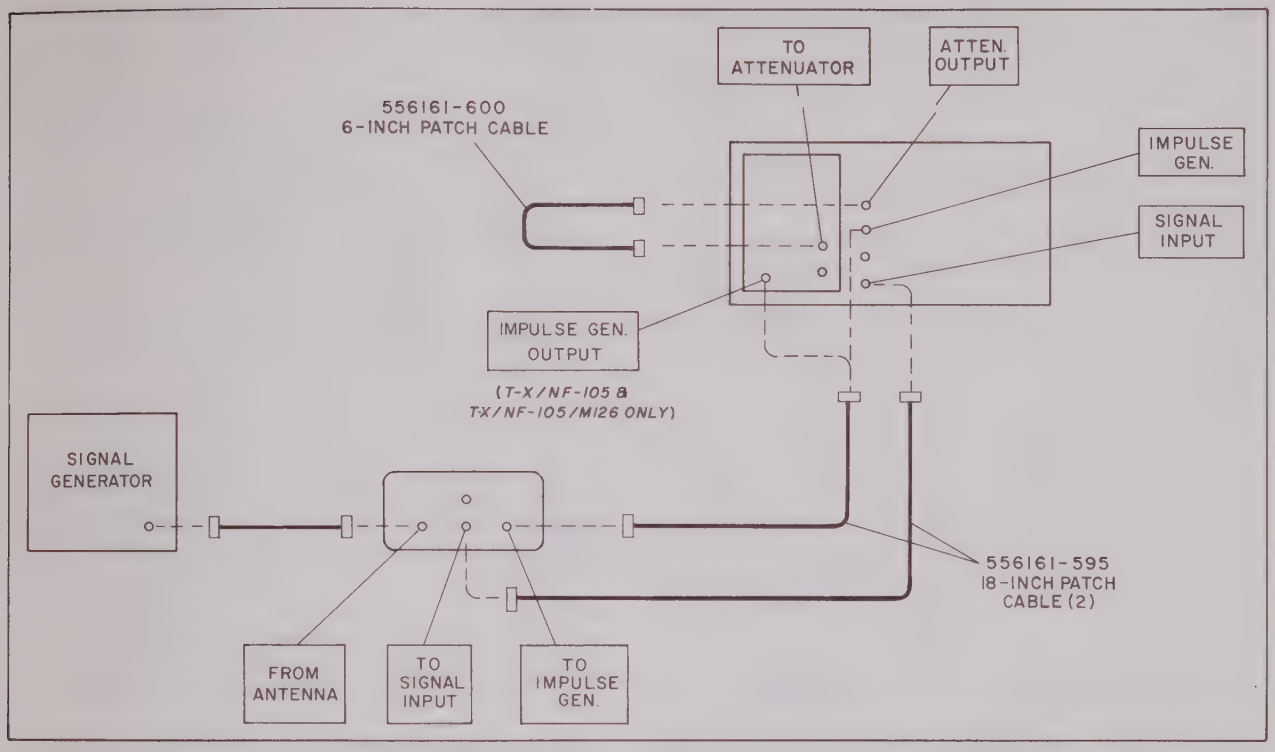


Figure 4-36. Equipment Setup for Obtaining Calibration Chart Data

h. Energize the impulse generator and adjust its output level to obtain an output meter indication of 20 on the DB scale. Note the impulse generator level necessary to produce this meter indication - this is the level that is to be recorded in the appropriate column in the calibration chart. De-energize the impulse generator.

i. Repeat steps c through h for all the frequencies specified in the appropriate tuning unit calibration chart.

4-48. REPAIR AND REPLACEMENT PROCEDURES.

4-49. The procedures for the removal, repair and replacement of non-standard components peculiar to the equipment are detailed in paragraphs 4-50 through 4-52.

4-50. REPAIR OR REPLACEMENT OF BASIC UNIT IMPULSER CONTACTS. To repair or replace the contacts within the basic unit impulser, proceed as directed in the following steps.

a. With the basic unit withdrawn from its cabinet, rotate the IMPULSE GEN. CONTACT PRE-ADJ. screwdriver control fully clockwise.

b. Loosen the coupling that secures the shaft of the IMPULSE GEN. CONTACT PRE-ADJ. screwdriver control to the gear drive on the impulser assembly. Slide the coupling toward the front panel to disengage the linkage.

c. Loosen the couplings at each end of the shaft that couples the front panel Function Selector switch to the switch wafer located at the rear of the basic unit. Slide the couplings toward each other and remove the shaft.

d. Disconnect coaxial plug P3 from impulser output jack J23 and unsolder the three wires connected to the impulser assembly.

e. Remove the four screws that secure the impulser assembly to the basic unit frame and carefully withdraw the impulser from the equipment.

f. Loosen the Phillips-head screw that secures the wrench retaining plate (see figure 4-1) and remove center conductor removal wrench 3013 from its storage location.

g. Carefully insert the center conductor wrench into the impulser output jack so that the wrench pins engage the slots in the center conductor collar. Rotate the wrench a few turns counterclockwise to loosen the collar and then remove the wrench. Unscrew the collar.

h. Place the index finger of one hand over the impulser output jack and carefully turn the impulser so that the output jack faces down. Slowly withdraw the finger from the jack and remove the center conductor that slides from the barrel of the impulser (see figure 4-37).

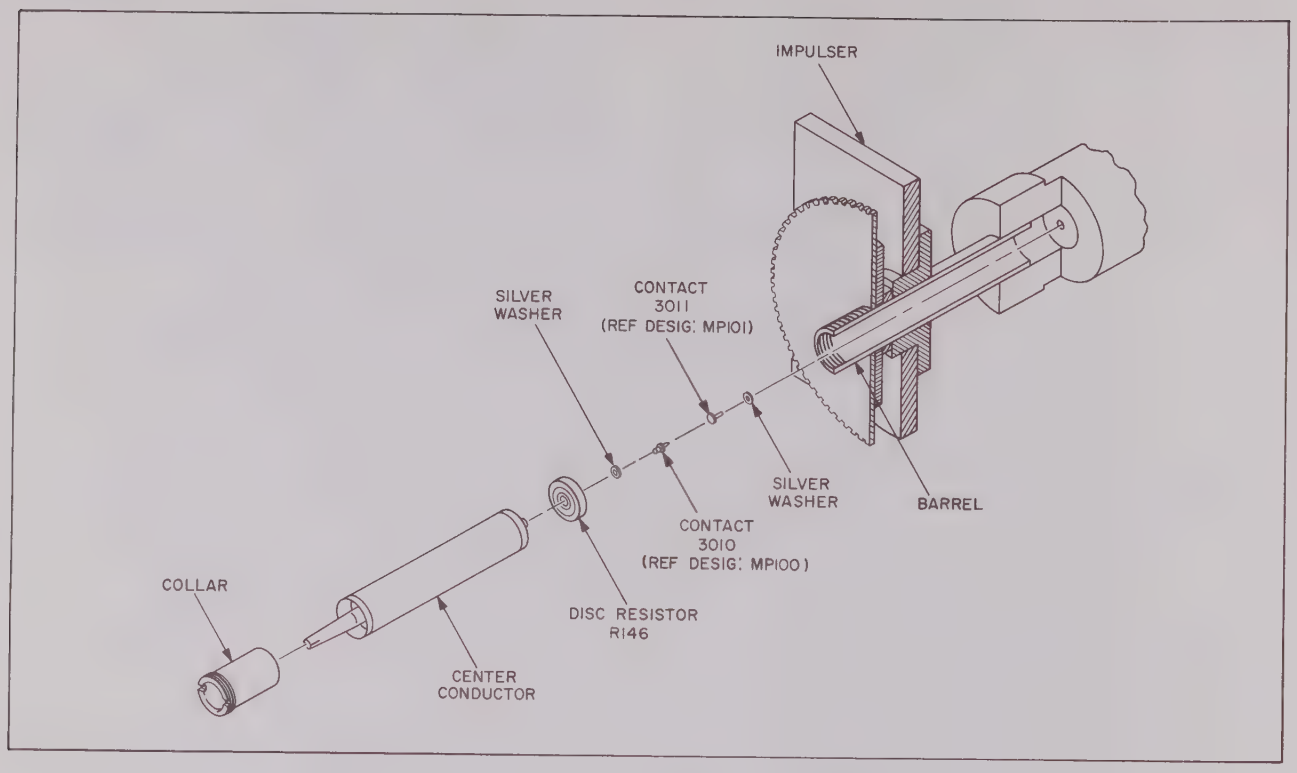


Figure 4-37. Impulser Assembly, Partial Exploded View

i. Using a magnifying glass, examine the contact at the end of the center conductor. If the contact appears heavily pitted or dirty, carefully place contact removal wrench 3014 (see figure 4-1) over the contact and rotate the wrench counterclockwise. Remove the contact, being careful not to lose the silver washer. If the contact is dirty, clean it with a piece of crocus cloth and then replace the contact. If the contact is pitted, remove spare contact 3010 (see figure 4-1) from its storage location on the impulser assembly and insert the replacement contact into the center conductor.

j. Insert contact removal wrench 3014 into the impulser barrel so that the wrench engages the other contact (see figure 4-37). Rotate the wrench counterclockwise to loosen the contact. Turn the impulser assembly (with the contact removal wrench still in place over the contact) so that the barrel faces down and continue rotating the wrench counterclockwise until the contact unscrews. Carefully withdraw the wrench and contact, being careful not to lose the silver washer.

CAUTION

DO NOT EXERT AXIAL FORCE WHEN INSERTING CONTACT 3011 INTO THE IMPULSER BARREL. APPLY ONLY A TWISTING MOTION TO THE WRENCH AND SUPPLY ONLY ENOUGH TORQUE TO FINGER-TIGHTEN THE CONTACT.

k. Examine the contact through a magnifying glass. If the contact is dirty, clean it with a piece of crocus cloth and then replace the contact. If the contact is pitted, remove spare contact 3011 (see figure 4-1) from its storage location on the impulser assembly and insert the replacement contact into the impulser barrel.

l. Install the center conductor back into the impulser barrel (see figure 4-37), solder the three wires disconnected in step d and install the impulser assembly back into the equipment frame.

4-51. REPLACEMENT OF BASIC UNIT IMPULSE GENERATOR OUTPUT ATTENUATOR. To replace the impulse generator output attenuator within the basic unit, proceed as directed in the following steps.

a. Loosen the two setscrews that secure the IMPULSE GEN. OUTPUT DBMHZ switch knob to the switch shaft. Remove the knob.

b. Remove the four screws and associated hardware that secure the IMPULSE GEN. jack to the basic unit front panel.

c. Disconnect coaxial plug P3 from impulser output jack J23.

d. Remove the three screws that secure the impulse generator output attenuator to the basic unit front panel and carefully lift the attenuator from the equipment.

e. Install the replacement attenuator by following the reverse of the preceding procedure.

4-52. REPLACEMENT OF SIGNAL INPUT ATTENUATOR. To replace the signal input attenuator, proceed as directed in the following steps.

a. Remove the impulse generator output attenuator from the basic unit as detailed in steps a through d of paragraph 4-51.

b. Loosen the two setscrews that secure the SIGNAL INPUT ATTENUATOR DB switch knob to the switch shaft. Remove the knob.

c. Loosen the two screws closest to the front panel that secure the shafts of the IMPULSE GEN. P.R.R. HZ control, IMPULSE GEN. P.R.R. switch and IMPULSE GEN. FINE CONTACT ADJ. controls to their couplings on the impulse generator driver chassis. Disengage these shafts from the couplings and withdraw the shafts from the equipment through their front panel holes.

d. Remove the four screws and associated hardware that secure the ATTEN. OUTPUT jack to the basic unit front panel.

e. Remove the four screws and associated hardware that secure the SIGNAL INPUT jack to the basic unit front panel.

f. Remove the six screws that secure the impulse generator driver chassis to the basic unit frame. Slide the chassis toward the rear of the equipment.

g. Remove the three screws that secure the signal input attenuator to the basic unit front panel.

h. Carefully slide the signal input attenuator toward the center of the basic unit.

i. Unsolder the four wires connected to the rotary switch at the rear of the signal input attenuator.

j. Lift the signal input attenuator from the basic unit.

k. Install a replacement signal input attenuator by following the reverse of the preceding procedure. After the replacement attenuator has been installed, replace the impulse generator output attenuator (refer to paragraph 4-51).

4-53. TYPICAL VOLTAGE MEASUREMENTS.

4-54. Typical voltage measurements for the Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters are included in tables 4-8 through 4-16.

TABLE 4-8. MODELS BA-105 AND BA-105/M-126 BASIC MEASURING UNITS, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V18	6AL5	0	-1.1vdc	0	6.3vac	0	NC	NC	-	-
V19	12AT7	-.36vdc	-.36vdc	0	2.8vac	2.8vac	150vdc	28vdc	30vdc	2.8vac
V20	12AU7	22vdc	0	0.16vdc	2.8vac	2.8vac	140vdc	0	2.3vdc	2.8vac
V21	6DJ8	86vdc	0	1.9vdc	5.2vac	0	150vdc	0	3.4vdc	NC
V23	12AU7	145vdc	-37vdc	8	5.7vac	5.7vac	145vdc	-37vdc	0	0
V24	12AU7	160 & 250vdc	+33 & -90vdc	20 & 37vdc	5.7vac	5.7vac	250 & 160vdc	-70 & +30vdc	20 & 37vdc	0
V25	12AU7	250vdc	80vdc	100vdc	5.7vac	5.7vac	250vdc	90vdc	100vdc	0
V26	6X4	250vac	NC	0	5.6vac	NC	250vac	290vdc	-	-
V27	6X4	260vac	NC	0	5.6vac	NC	260vac	360vdc	-	-
V28	6X4	-210vdc	NC	0	5.6vac	NC	-210vdc	215vac	-	-
V29	6X4	220vac	NC	0	5.6vac	NC	220vac	165vdc	-	-
V30	6X4	220vac	NC	0	5.6vac	NC	220vac	170vdc	-	-
V31	OA2	0	-150vdc	NC	-150vdc	0	NC	-150vdc	-	-

*See Notes 1 through 9 following table 4-16.

TABLE 4-9. MODELS T-X/NF-105 AND T-X/NF-105/M-126 TUNING UNITS, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V901	6BA6	0	0	0	5.6vac	140vdc	105vdc	2.3vdc	-	-
V902	6C4	130vdc	NC	5.6vdc	0	NC	-8.6vdc	0	-	-
V903	6CB6A	-14.5vdc	0	0	5.6vac	145vdc	145vdc	0	-	-
V904	6BJ6	-14.5vdc	0	0	5.6vac	148vdc	140vdc	0	-	-
V905	6BJ6	-1.4vdc	1.6vdc	0	5.6vac	145vdc	92vdc	0	-	-
V906	6BJ6	0	4vdc	0	5.6vac	250vdc	133vdc	0	-	-
V907	6BJ6	-2.2vdc	0	5.6vac	0	61vdc	61vdc	0	-	-
V908	2D21	-8vdc	0	5.6vac	0	0	122vdc	NC	-	-
V909	6C4	140vdc	0	5.6vac	0	NC	-20vdc	0	-	-

*See Notes 1 through 8, 10 and 11 following table 4-16.

TABLE 4-10. MODELS T-A/NF-105 AND T-A/NF-105/M-126 TUNING UNITS, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V700	5702	130vdc	110vdc	0	5.4vac	0	1.4vdc	0	-	-
V701	5784	130vdc	90vdc	0	5.1vac	5.4vac	1.45vdc	0	-	-
V702	5702	92vdc	94vdc	0	5.6vac	0	0	-8vdc	-	-
V703 Note 12	6BJ6	-13.5vdc	0.2vdc	0	5.6vac	140vdc	130vdc	0	-	-
V704 Note 12	6BJ6	-14vdc	0.3vdc	0	5.6vac	140vdc	130vdc	0	-	-
V705 Note 12	6BJ6	-2.6vdc	0.8vdc	0	5.5vac	140vdc	100vdc	0	-	-
V706 Note 12	6BJ6	0	3.8vdc	0	5.5vac	250vdc	120vdc	0	-	-
V707 Note 13	6BJ6	-13.5vdc	0.05vdc	0	5.6vac	130vdc	130vdc	0	-	-
V708 Note 13	6BJ6	-14.0vdc	0.05vdc	0	5.5vac	135vdc	130vdc	0	-	-
V709 Note 13	6BJ6	0	1vdc	0	5.5vac	135vdc	80vdc	0	-	-
V710 Note 13	6BJ6	0	3.9vdc	0	5.5vac	250vdc	120vdc	0	-	-
V711	7586	NC	0	NC	5.5vac	NC	NC	NC	22vdc	10 / 100 vdc; 12 / 25 vdc

*See Notes 1 through 8, 12 and 13 following table 4-16.

TABLE 4-11. MODEL T-1/NF-105 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V8 Note 14	6AK5	0	2.6vdc	0	5.2vac	150vdc	150vdc	2.6vdc	-	-
V9 Note 14	6AK5	0	2.4vdc	5.2vac	0	150vdc	110vdc	2.4vdc	-	-
V10 Note 14	12AT7	150vdc	0	2.5vdc	5.4vac	5.4vac	130vdc	-2.9vdc	0	0
V11 Note 15	6AK5	0	1.1vdc	0	5.2vac	150vdc	86vdc	1.25vdc	-	-
V12 Note 15	6AK5	0	1.7vdc	0	5.2vac	150vdc	103vdc	1.7vdc	-	-
V13 Note 15	6U8	105vdc	-5.2vdc	105vdc	5.2vac	0	100vdc	0	-6.8vdc	NC
V14	6AK5	-6vdc	0	5.3vac	0	150vdc	150vdc	0	-	-
V15	6BJ6	-8vdc	0.25vdc	5.3vac	0	150vdc	150vdc	0	-	-
V16	6BJ6	-5.5vdc	0.4vdc	5.2vac	0	240vdc	150vdc	0	-	-
V17	6BJ6	0	6.5vdc	5.3vac	0	240vdc	240vdc	240vdc	-	-

*See Notes 1 through 8, 14 and 15 following table 4-16.

TABLE 4-12. MODEL T-1/NF-105/M-126 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V8 Note 14	6AK5	0	2.2vdc	0	5.2vac	140vdc	140vdc	2.2vdc	-	-
V9 Note 14	6AK5	0	2vdc	5.2vac	0	140vdc	140vdc	2.0vdc	-	-
V10 Note 14	12AT7	150vdc	0	2.2vdc	5.2vac	5.2vac	75vdc	-1.2vdc	0	0
V11 Note 15	6AK5	0	1.3vdc	0	5.2vac	140vdc	85vdc	1.3vdc	-	-
V12 Note 15	6AK5	0	1.45vdc	0	5.2vac	140vdc	110vdc	0	-	-
V13 Note 15	6U8	65vdc	-1.2vac	90vdc	5.2vac	0	90vdc	.90vdc	0	-4.6vdc
V14	6AK5	-6vdc	0	5.2vac	0	150vdc	150vdc	0	-	-
V15	6BJ6	-8vdc	0.2vdc	5.2vac	0	140vdc	140vdc	0	-	-
V16	6BJ6	-5.2vdc	0.4vac	5.1vac	0	250vdc	150vdc	0	-	-
V17	6BJ6	0	6.3vac	5.1vac	0	250vdc	250vdc	250vdc	-	-
V40	6AK5	-7.8vdc	0	0	5.3vac	150vdc	150vdc	0	-	-

*See Notes 1 through 8, and 14 through 16 following table 4-16.

TABLE 4-13. MODEL T-2/NF-105 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V1	5876	Plate: 150vdc Cathode: .4vdc Filaments: 5.3vac								
V2	6F4	0	-1.6vdc	50vdc	50vdc	-1.6vdc	5.5vac	0	-	-
V3	6BJ6	0	1.7vdc	5.4vac	0	120vdc	120vdc	0	-	-
V4	6BJ6	-8.2vdc	.3vdc	5.4vac	0	140vdc	140vdc	0	-	-
V5	6BJ6	-8.0vdc	.1vdc	5.4vac	0	145vdc	150vdc	0	-	-
V6	6BJ6	-6vdc	.7vdc	5.4vac	0	250vdc	150vdc	0	-	-
V7	6BJ6	0	6.6vdc	5.4vac	0	250vdc	250vdc	250vdc	-	-

*See Notes 1 through 8 following table 4-16.

TABLE 4-14. MODEL T-2/NF-105/M-126 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V1	5876	Plate: 140vdc Cathode: .4vdc Filaments: 5.4vdc								
V2	6F4	5.2vac	NC	29vdc	29vdc	-1.30vdc	0	0	-	-
V3	6BJ6	90vdc	0	.9vdc	0	5.1vac	110vdc	0	+1vdc	0
V4	6BJ6	-8.3vdc	0.68vdc	5.1vdc	0	135vdc	135vdc	0	-	-
V5	6BJ6	-8.3vdc	0.5vdc	5.1vac	0	135vdc	135vdc	0	-	-
V6	6BJ6	-5.5vdc	0.95vdc	5.2vac	0	250vdc	140vdc	0	-	-
V7	6BJ6	0	7.8vdc	5.3vac	0	250vdc	250vdc	250vdc	-	-
V900	6AK5	-8.3vdc	0	5.5vac	0	150vdc	150vdc	0	-	-

*See Notes 1 through 8 and 16 following table 4-16.

TABLE 4-15. MODEL T-3/NF-105 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V601 Note 17	5876	Plate: 140vdc Cathode: .4vdc Filament: 5.4vac								
V602 Note 17	6F4	5.5vac	NC	NC	150vdc	0	0	0	-	-
V603 Note 18	5876	Plate: 140vdc Cathode: .46vdc Filament: 5.4vac								
V604 Note 18	6T4	28vdc	-3vdc	6.3vac	0	0	-3vdc	28vdc	NC	NC
V605	6BQ7	100vdc	0	.85vdc	0	5vac	120vdc	0	2vdc	0
V606	6AK5	-15vdc	0	0	5.1vac	140vdc	140vdc	0	-	-
V607	6AK5	-15vdc	0	0	5.2vac	140vdc	140vdc	0	-	-
V608	6AK5	-15vdc	0	0	5.3vac	145vdc	145vdc	0	-	-
V609	6BJ6	0	3.2vdc	0	5.5vac	250vdc	125vdc	0	-	-
V610	6BJ6	0	8.0vdc	5.5vac	0	250vdc	250vdc	250vdc	-	-

*See Notes 1 through 8, 17 and 18 following table 4-16.

TABLE 4-16. MODEL T-3/NF-105/M-126 TUNING UNIT, VOLTAGE MEASUREMENTS*

Reference Symbol Number	Tube Type	Socket Pin Number								
		1	2	3	4	5	6	7	8	9
V601 Note 17	5876	Plate: 140vdc Cathode: .4vdc Filament: 5.5vac								
V602 Note 17	6F4	5.2vac	NC	NC	60vdc	-.7vdc	0	0	-	-
V603 Note 18	5876	Plate: 140vdc Cathode: .5vdc Filament: 5.5vdc								
V604 Note 18	6T4	75vdc	-.3vdc	0	0	0	-.3vdc	75vdc	-	-
V605	6BQ7	100vdc	0	.8vdc	5.1vac	0	125vdc	0	1.6vdc	0
V606	6AK5	-15vdc	0	0	5.1vac	145vdc	145vdc	0	-	-
V607	6AK5	-15vdc	0	0	5.2vac	145vdc	145vdc	0	-	-
V608	6AK5	-15vdc	0	0	5.3vac	145vdc	145vdc	0	-	-
V609	6BJ6	0	3.4vdc	0	5.3vac	250vdc	130vdc	3.4vdc	-	-
V610	6BJ6	0	7vdc	0	5.4vac	250vdc	250vdc	250vdc	-	-
V611	6AK5	-15vdc	0	5.4vac	0	150vdc	150vdc	0	-	-

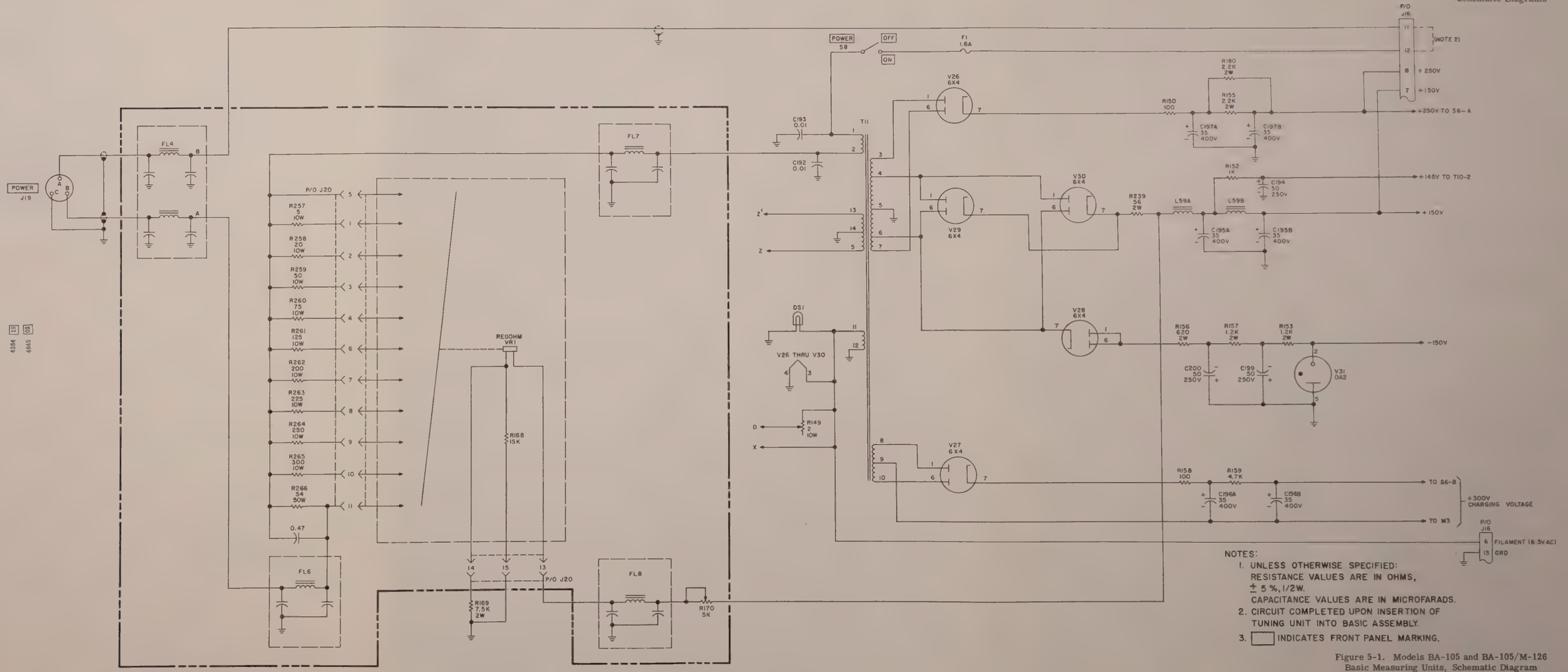
*See Notes 1 through 8, and 16 through 18 following table 4-16.

Note

The following notes apply to tables 4-8 through 4-16.

1. Tuning unit is connected to basic unit.
2. All voltages are measured with a 20,000 ohms per volt vom with respect to equipment ground.
3. No signal applied to tuning unit.
4. SLIDEBACK control set fully CCW.
5. IF GAIN control set fully CCW.
6. VOLUME control set fully CW.
7. Function Selector Switch set to METER BAL.
8. METER BAL. control set fully CCW.
9. IMPULSE GEN. switch held on.
10. BFO switch set to ON.
11. IMPULSE GEN. switch (T-X Tuning Unit) set to ON.
12. Band Selector switch set to band 1 or 3.
13. Band Selector switch set to band 2, 4, 5 or 6.
14. Band Selector switch set to 20-65 MHz.
15. Band Selector switch set to 65-200 MHz.
16. FINE TUNING control set to midposition.
17. Band Selector switch set to 400-700 MHz.
18. Band Selector switch set to 700-1000 MHz.

SECTION V
SCHEMATIC DIAGRAMS



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5 %, 1/2W.
   CAPACITANCE VALUES ARE IN MICROFARADS.
2. CIRCUIT COMPLETED UPON INSERTION OF TUNING UNIT INTO BASIC ASSEMBLY.
3. ☐ INDICATES FRONT PANEL MARKING.

Figure 5-1. Models BA-105 and BA-105/M-126 Basic Measuring Units, Schematic Diagram (Sheet 1 of 3)

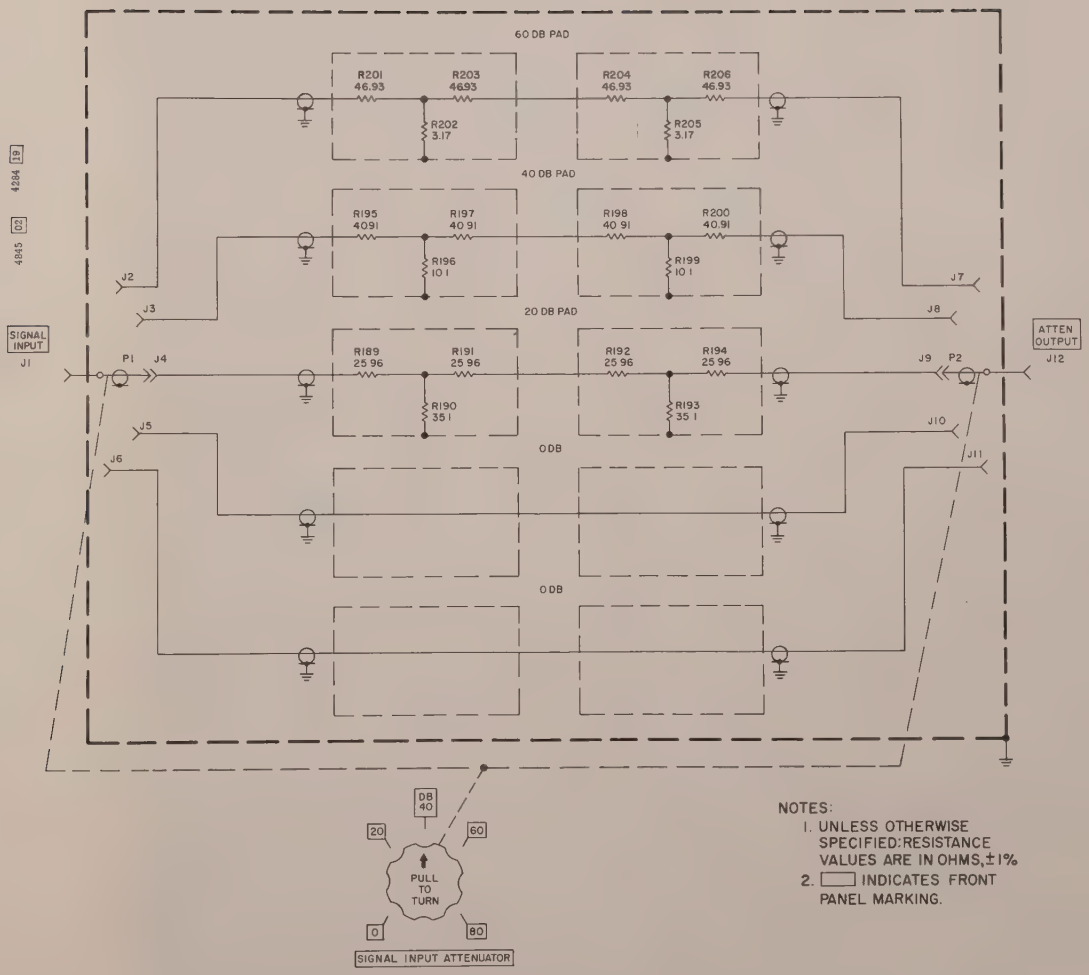


Figure 5-1. Models BA-105 and BA-105/M-126 Basic Measuring Units, Schematic Diagram (Sheet 2 of 3)

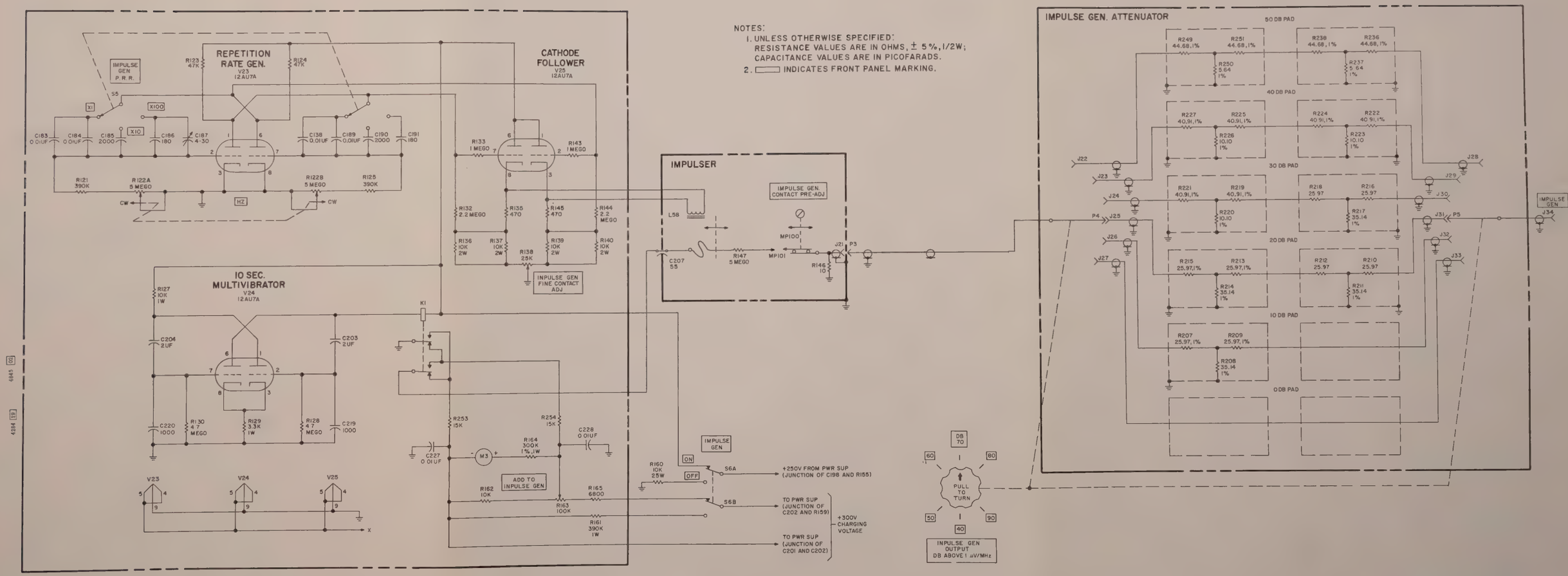


Figure 5-1. Models BA-105 and BA-105/M-126 Basic Measuring Units, Schematic Diagram (Sheet 3 of 3)

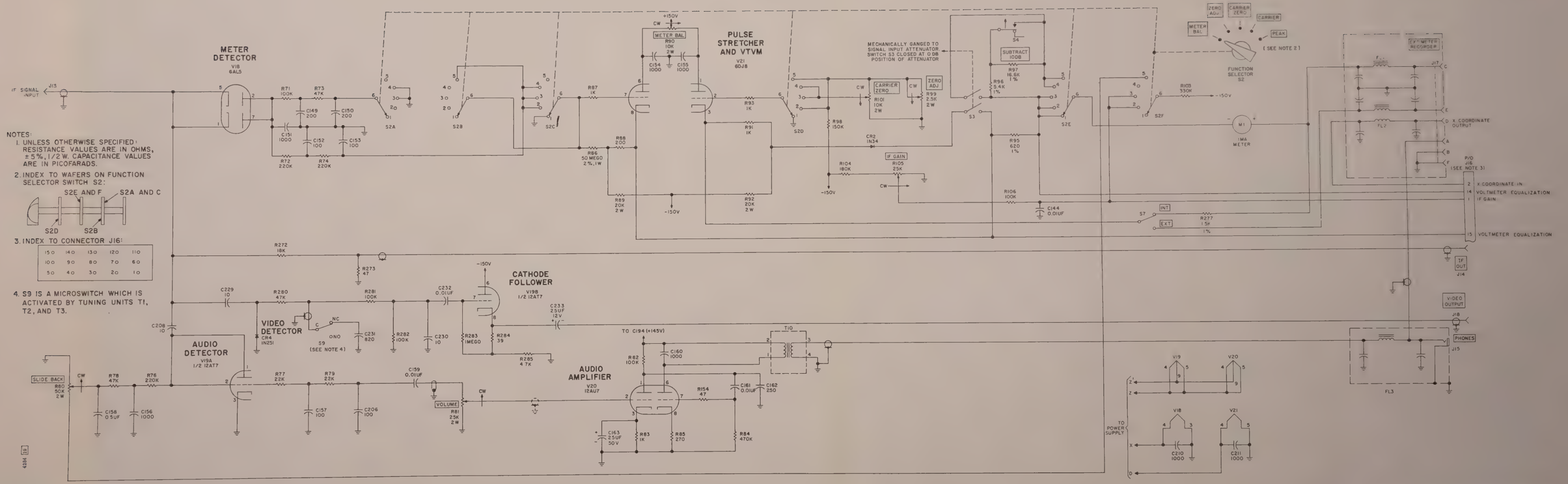


Figure 5-2. Model BA-105 Basic Measuring Unit Metering, Audio and Video Circuitry, Schematic Diagram

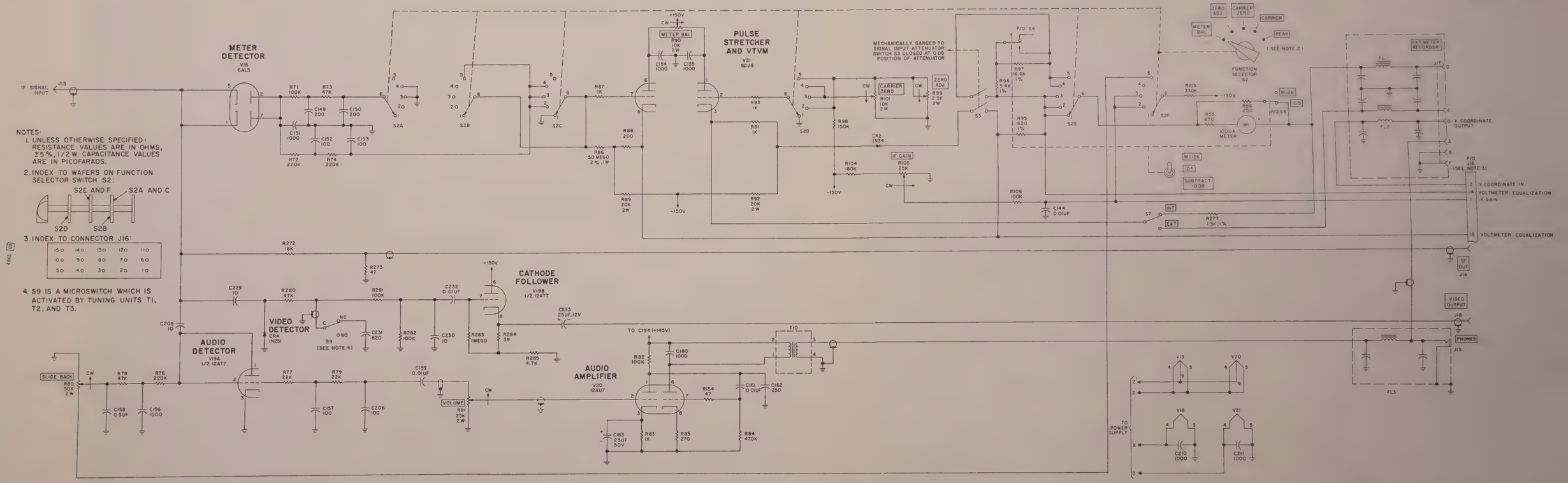
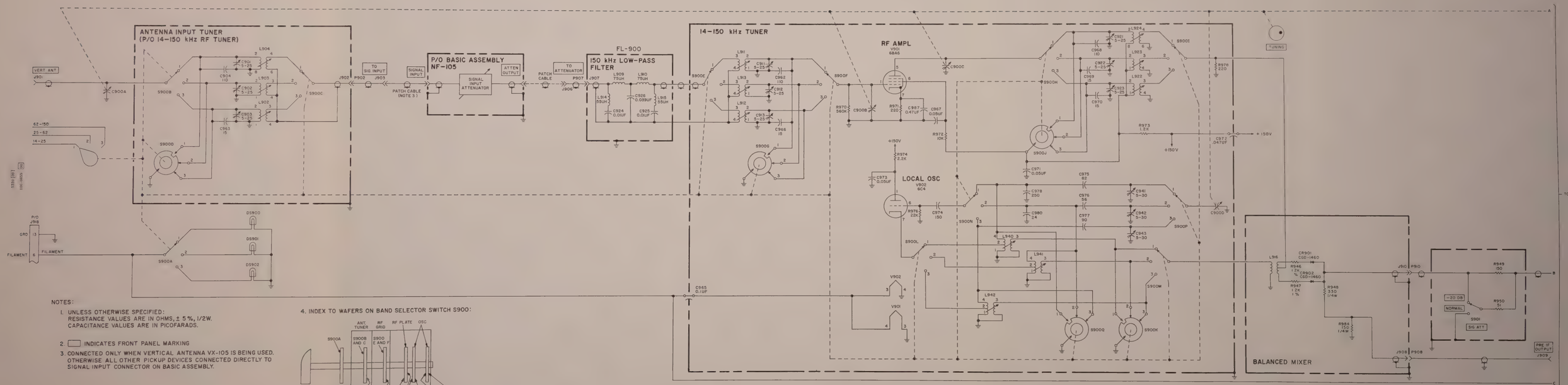


Figure 5-3. Model BA-105/M-126 Basic Measuring Unit Metering, Audio and Video Circuitry, Schematic Diagram



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/2W.
   CAPACITANCE VALUES ARE IN PICOFARADS.

2. ☐ INDICATES FRONT PANEL MARKING

3. CONNECTED ONLY WHEN VERTICAL ANTENNA VX-105 IS BEING USED. OTHERWISE ALL OTHER PICKUP DEVICES CONNECTED DIRECTLY TO SIGNAL INPUT CONNECTOR ON BASIC ASSEMBLY.

4. INDEX TO WAFERS ON BAND SELECTOR SWITCH S900:

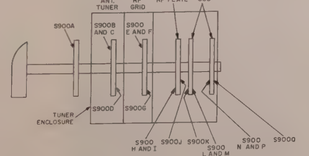


Figure 5-4. Models T-X/NF-105 and T-X/NF-105 M-126 Tuning Units, Schematic Diagram (Sheet 1 of 2)

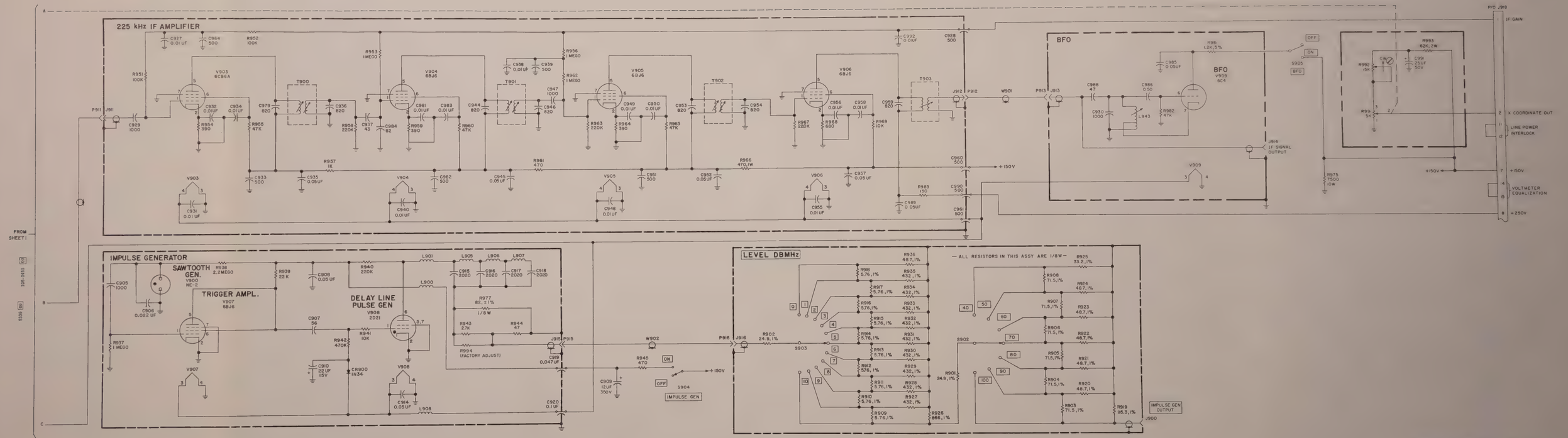


Figure 5-4. Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units, Schematic Diagram (Sheet 2 of 2)

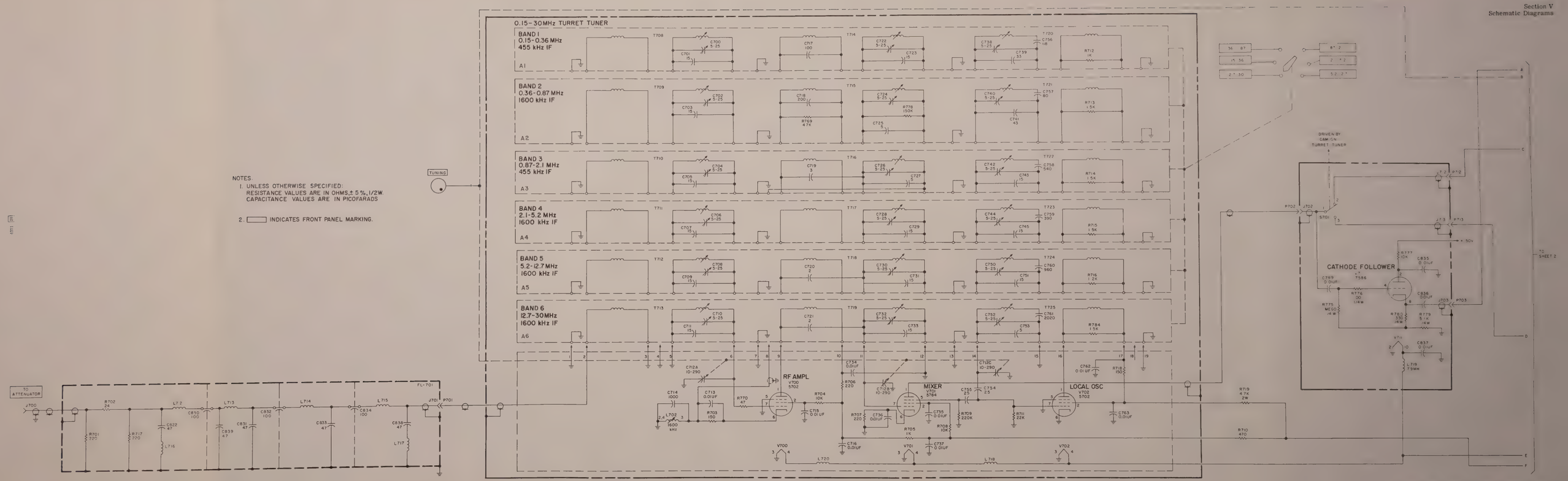


Figure 5-5. Model T-A NF-105 Tuning Unit, Schematic Diagram (Sheet 1 of 2)

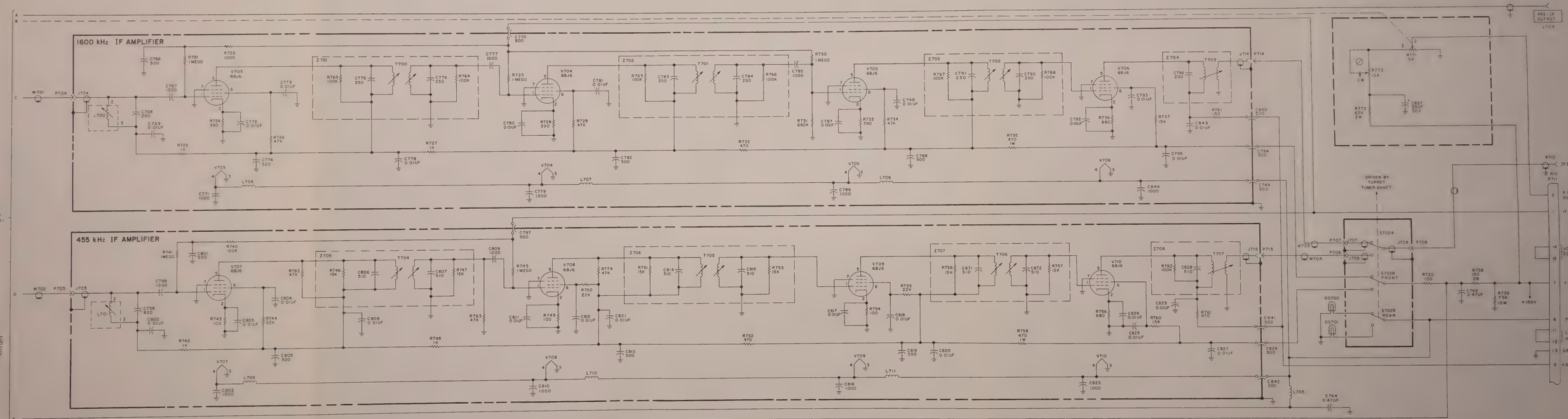


Figure 5-5. Model T-A NF-105 Tuning Unit, Schematic Diagram (Sheet 2 of 2)

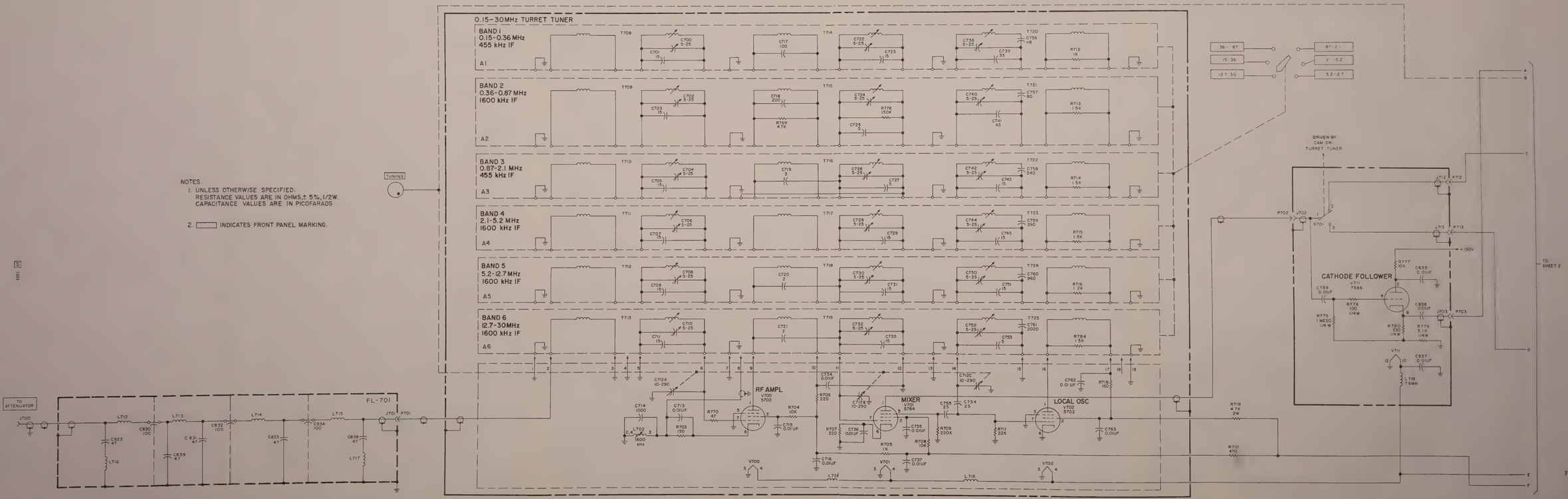


Figure 5-6. Model T-A NF-105 M-126 Tuning Unit, Schematic Diagram (Sheet 1 of 2)

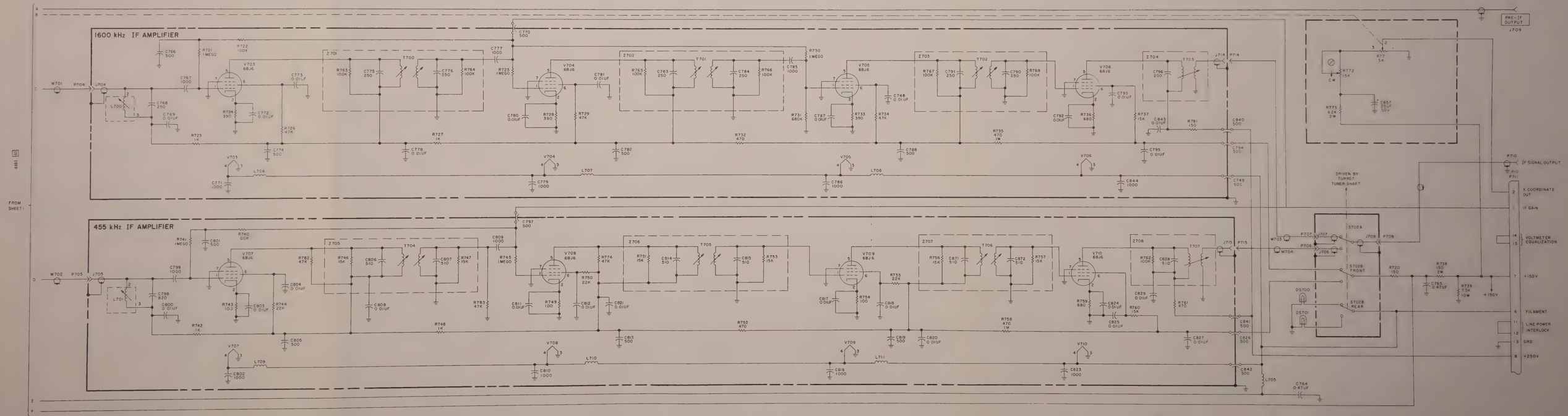
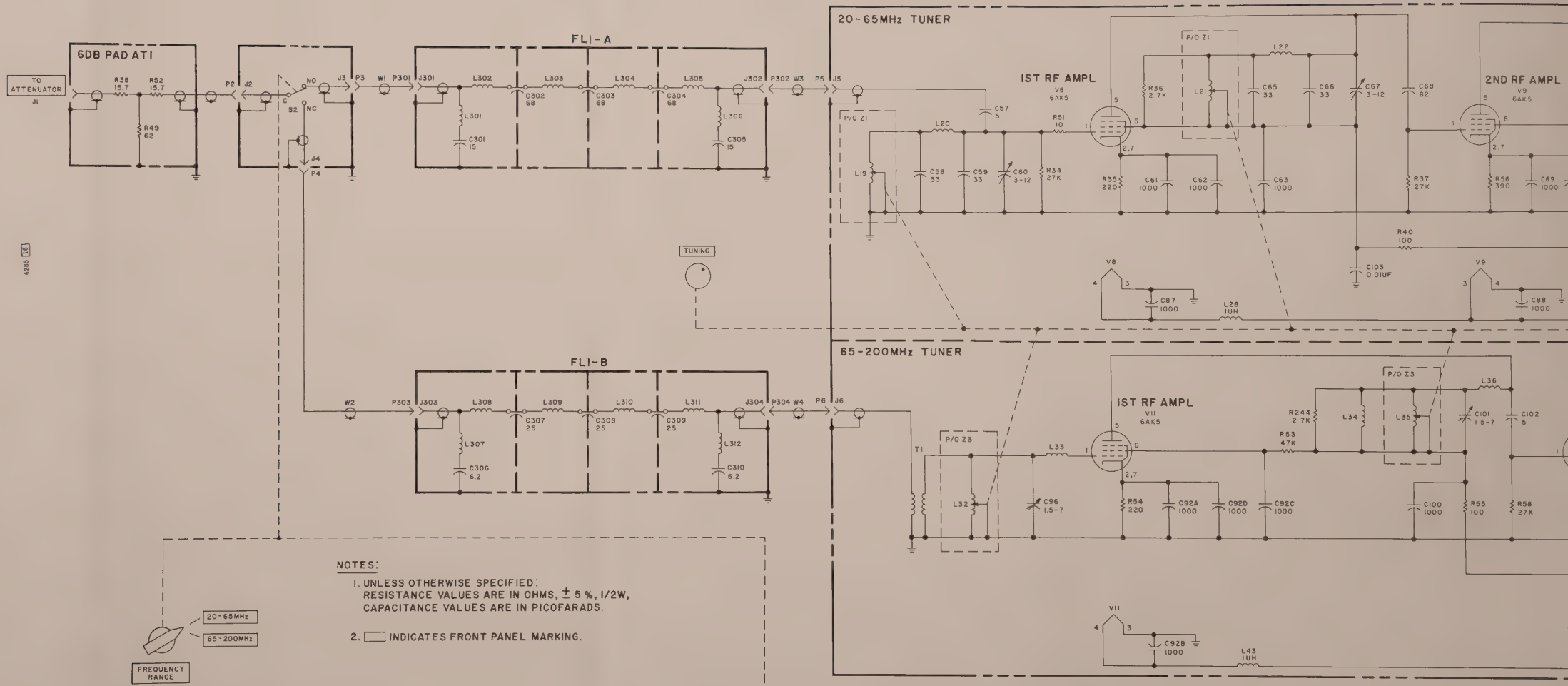


Figure 5-6. Model T-A/NF-105, M-126 Tuning Unit, Schematic Diagram (Sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5 %, 1/2W,
   CAPACITANCE VALUES ARE IN PICOFARADS.

2. ▭ INDICATES FRONT PANEL MARKING.

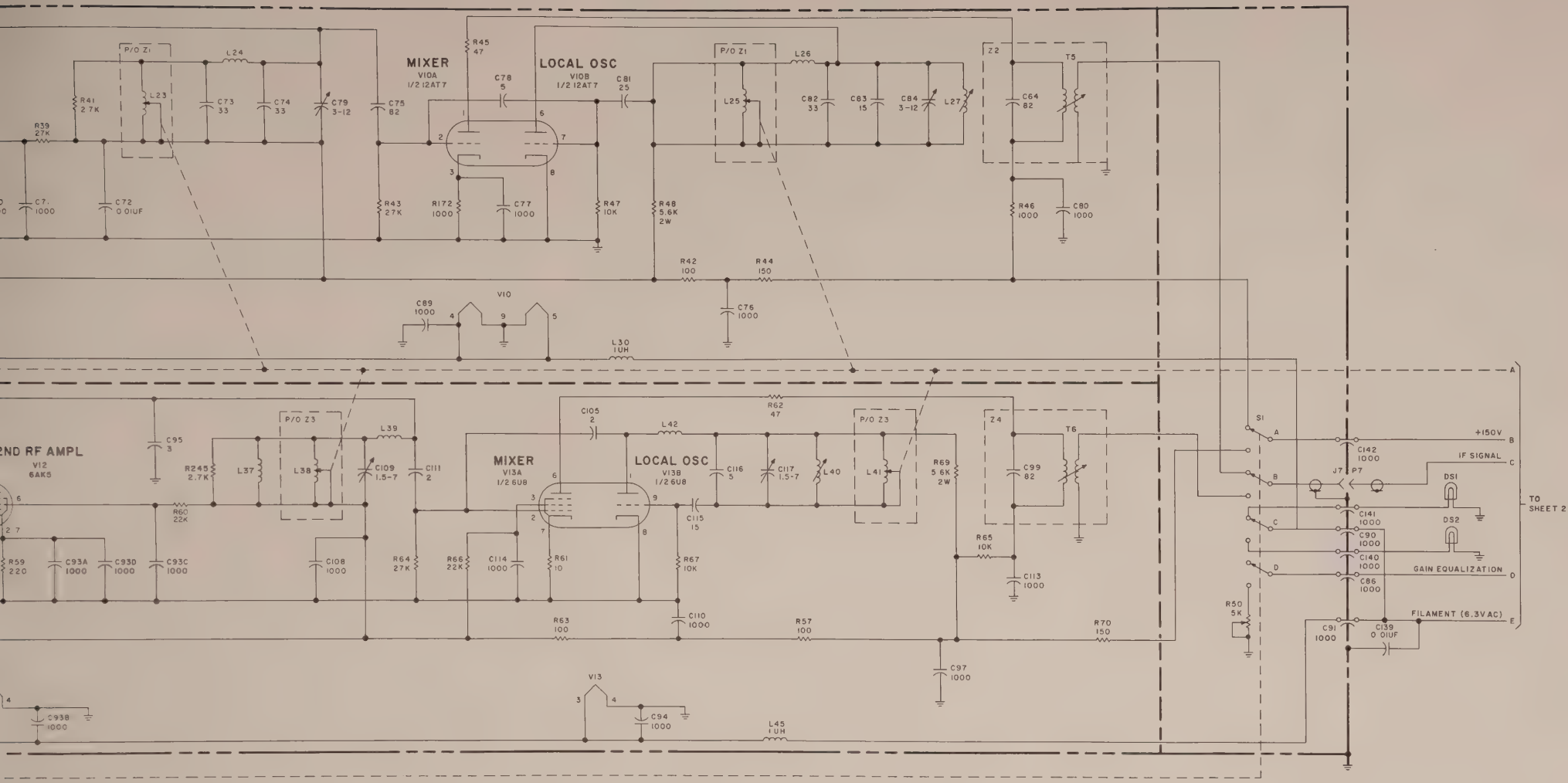


Figure 5-7. Model T-1/NF-105 Tuning Unit, Schematic Diagram (Sheet 1 of 2)

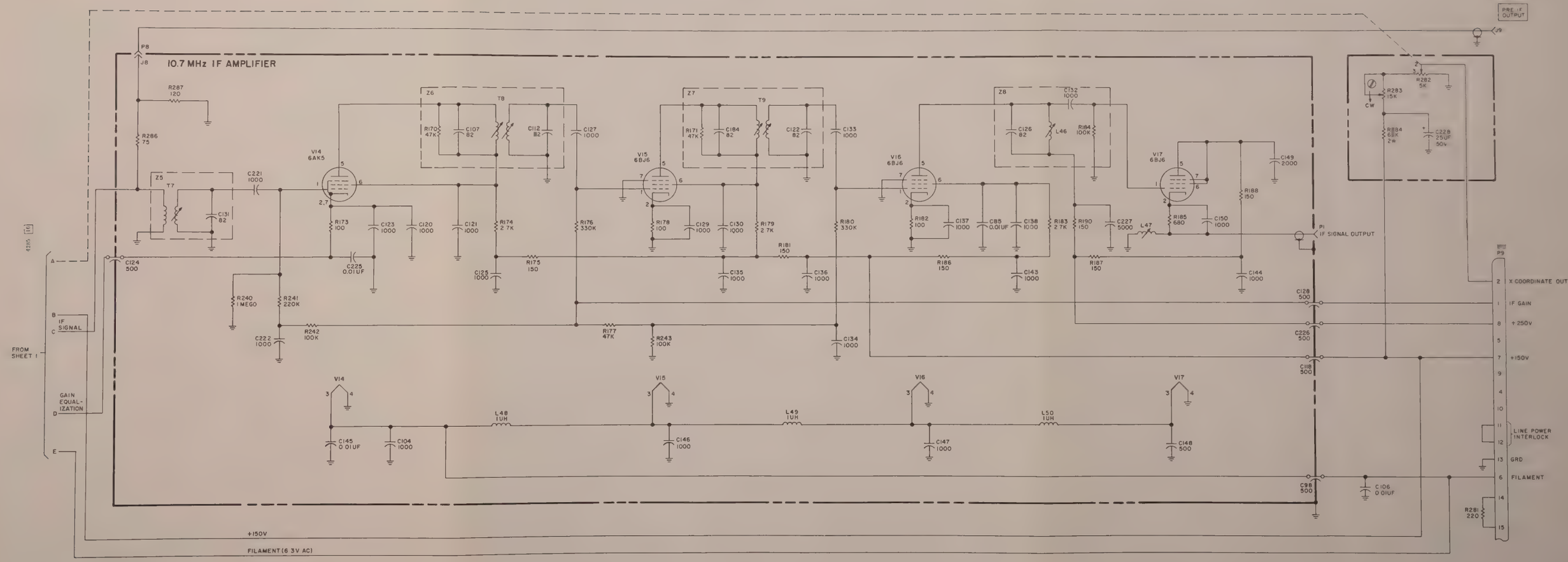
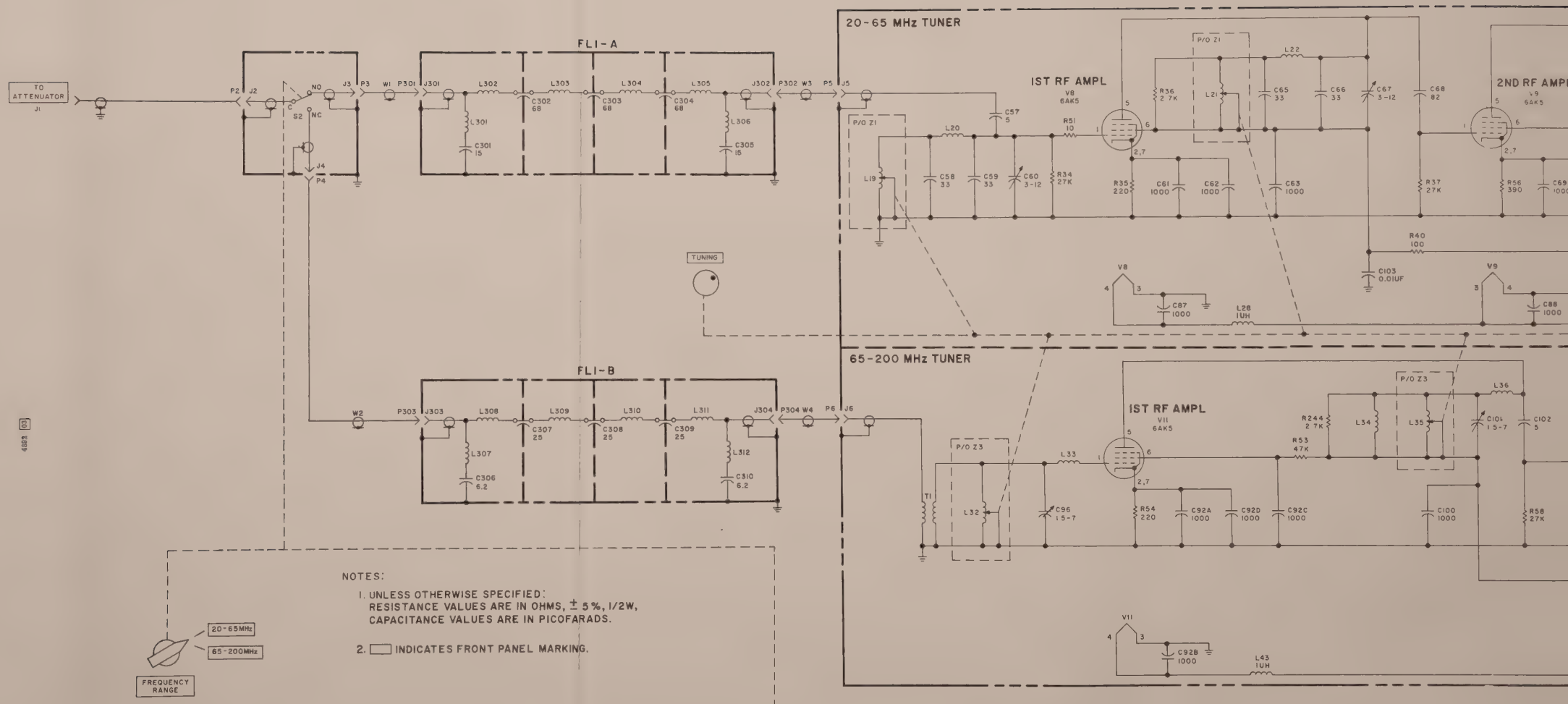


Figure 5-7. Model T-1/NF-105 Tuning Unit, Schematic Diagram (Sheet 2 of 2)


TO ATTENUATOR
J1
FL1-A
FL1-B
20-65 MHz TUNER
65-200 MHz TUNER
IST RF AMPL
V8
6AK5
2ND RF AMPL
V9
6AK5
IST RF AMPL
VII
6AK5
TUNING
FREQUENCY RANGE
20-65MHz
65-200MHz
NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/2W,
CAPACITANCE VALUES ARE IN PICOFARADS.
2. ▭ INDICATES FRONT PANEL MARKING.

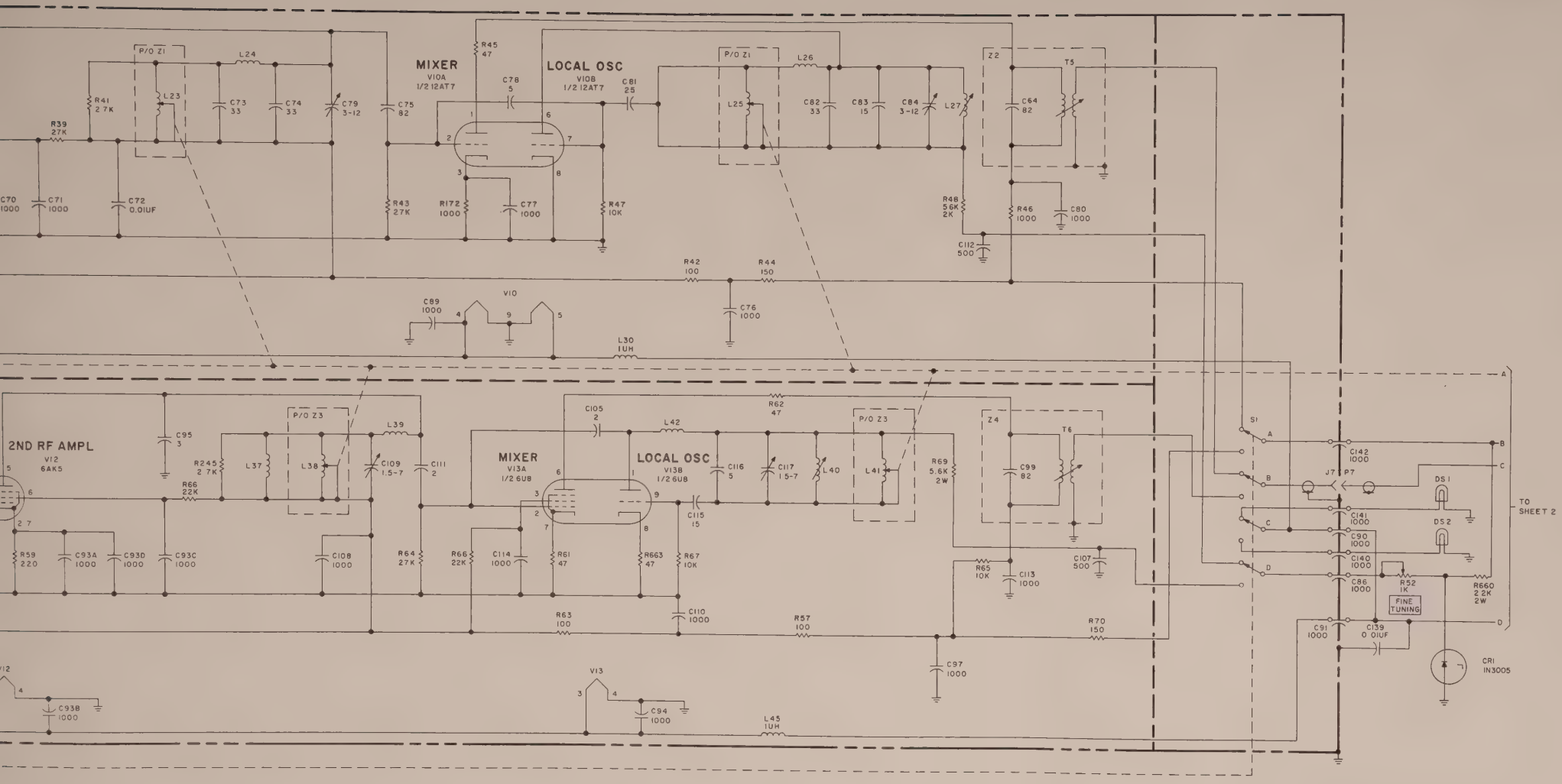


Figure 5-8. Model T-1/NF-105/M-126
Tuning Unit, Schematic Diagram
(Sheet 1 of 2)

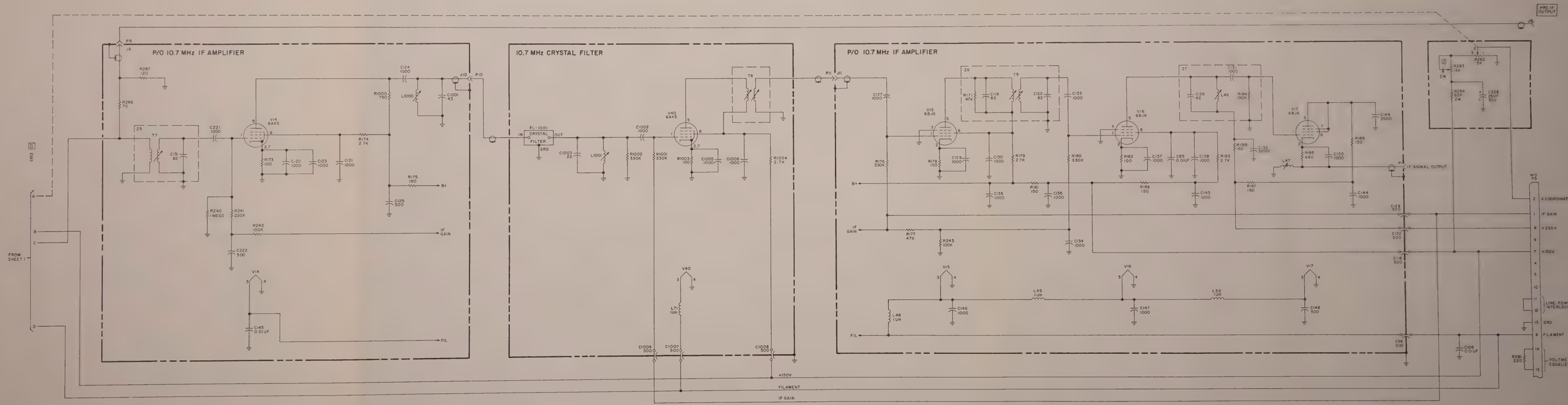
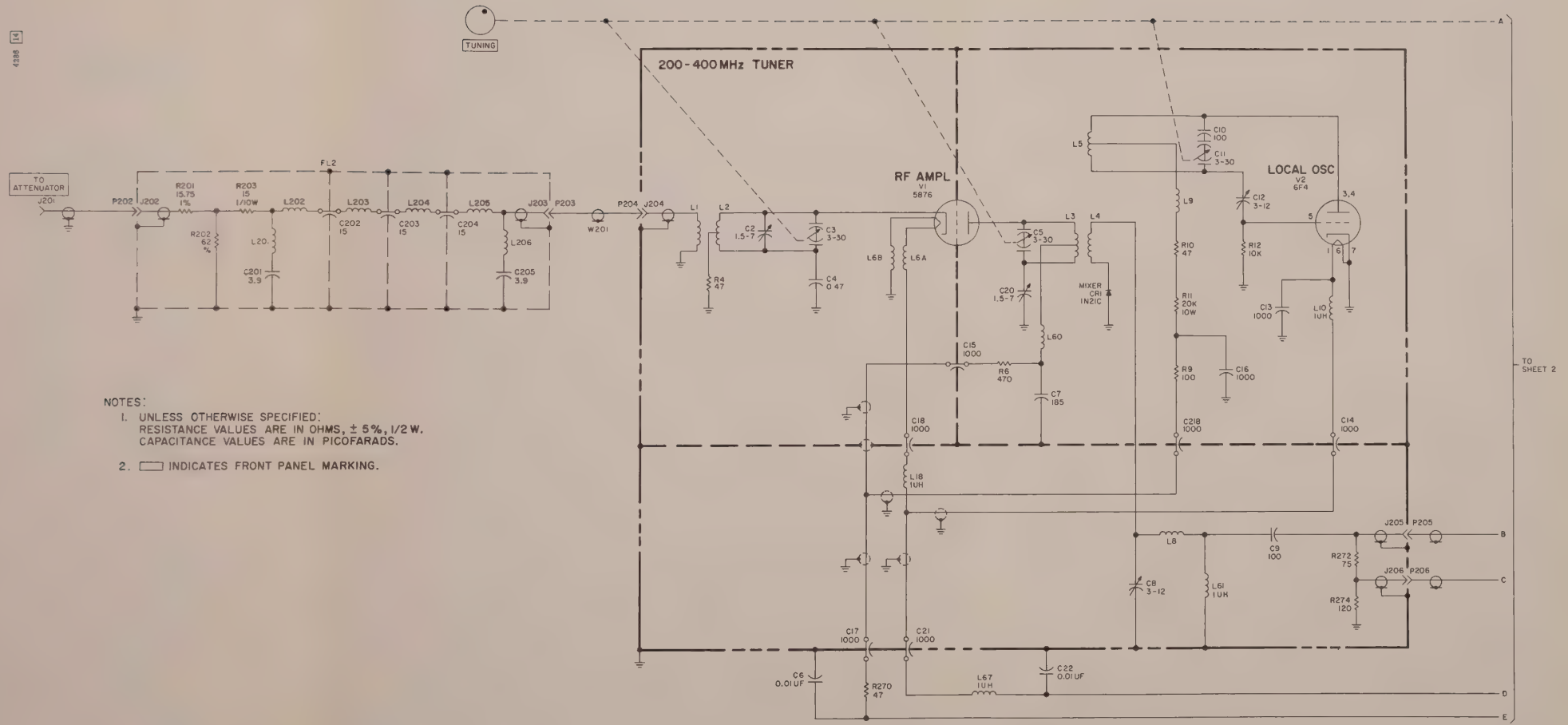


Figure 5-8. Model T-1/NF-105/M-126
Tuning Unit, Schematic Diagram
(Sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/2 W.
   CAPACITANCE VALUES ARE IN PICOFARADS.
2. ▭ INDICATES FRONT PANEL MARKING.

Figure 5-9. Model T-2/NF-105 Tuning Unit, Schematic Diagram (Sheet 1 of 2)

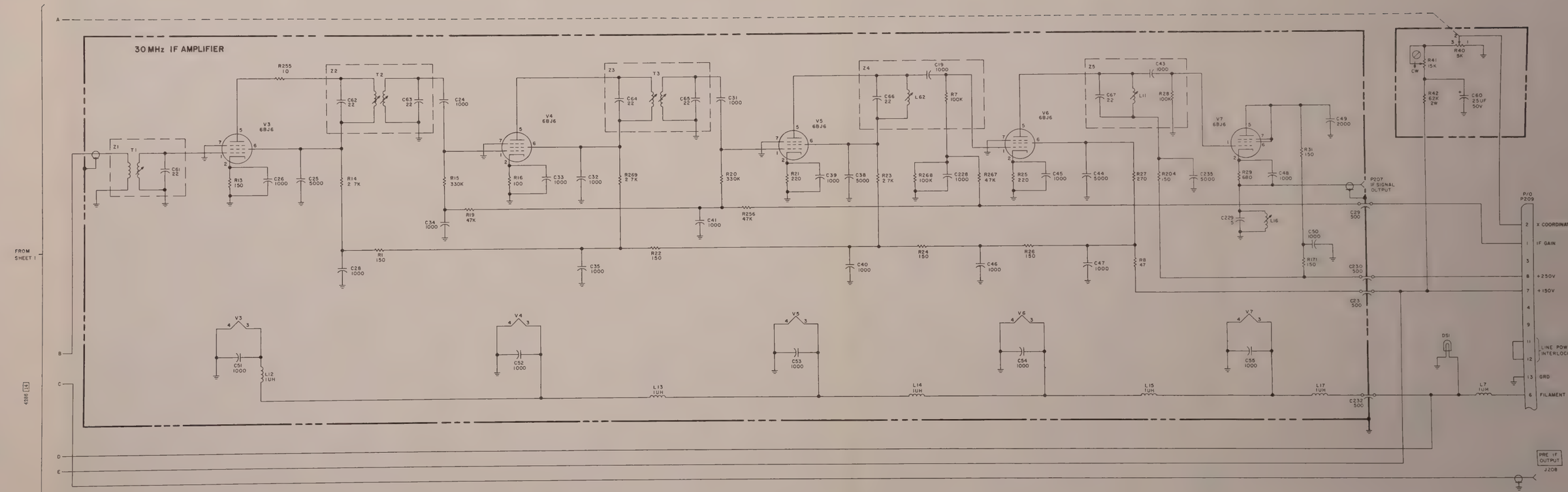
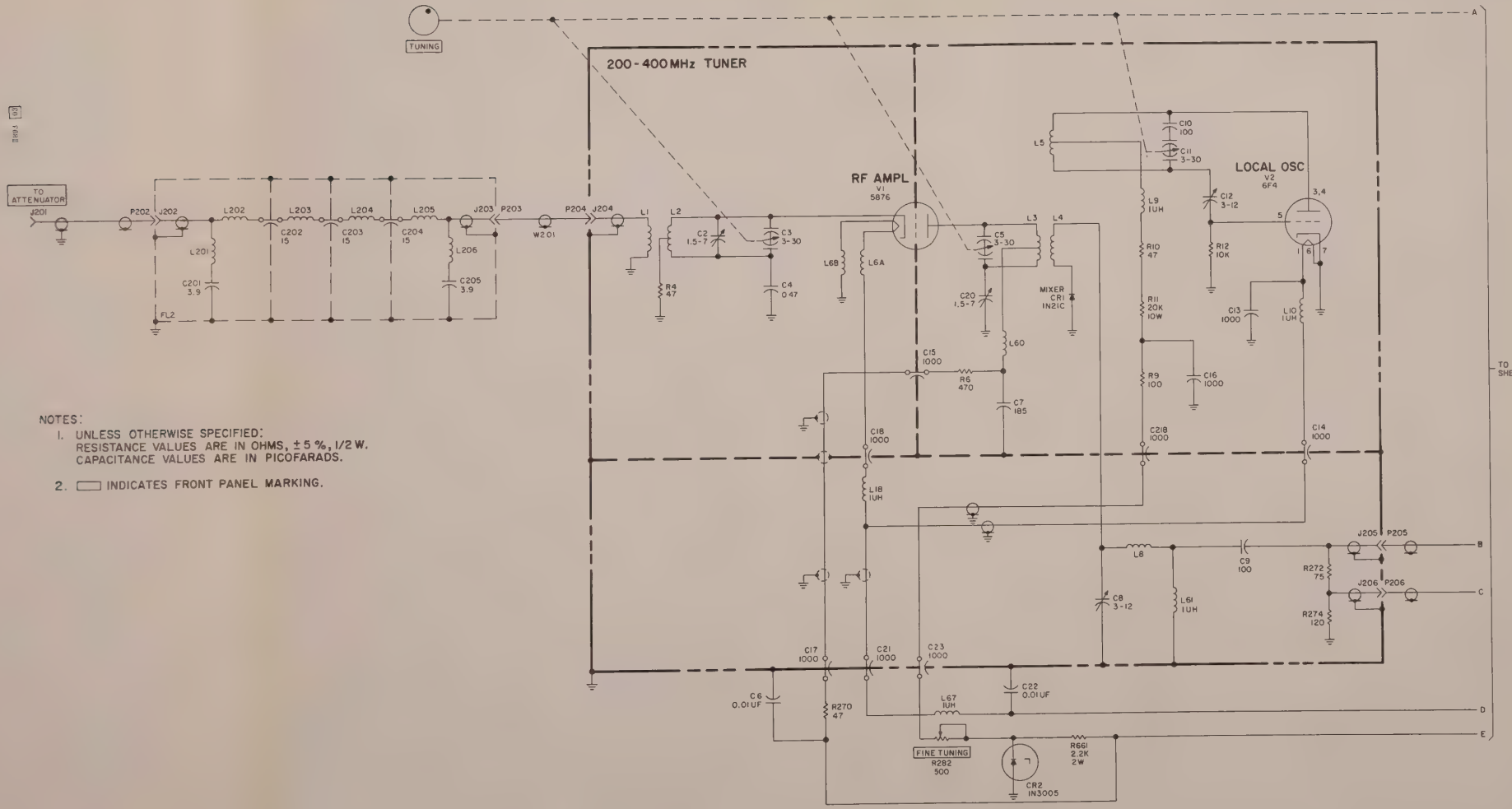


Figure 5-9. Model T-2/NF-105 Tuning Unit, Schematic Diagram (Sheet 2 of 2)



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5 %, 1/2 W.
   CAPACITANCE VALUES ARE IN PICOFARADS.
2. ▭ INDICATES FRONT PANEL MARKING.

Figure 5-10. Model T-2/NF-105/M-126
Tuning Unit, Schematic Diagram
(Sheet 1 of 2)

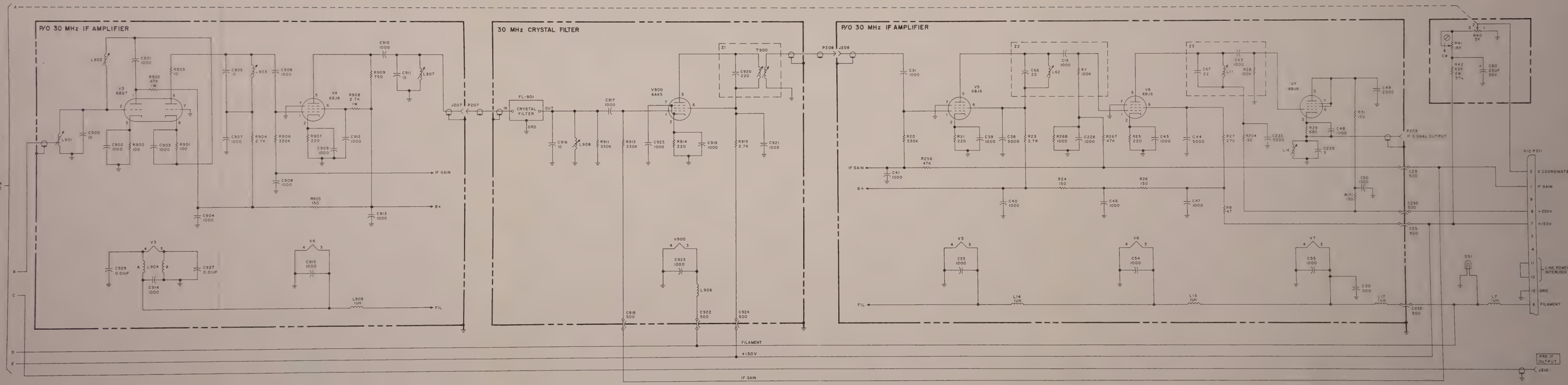
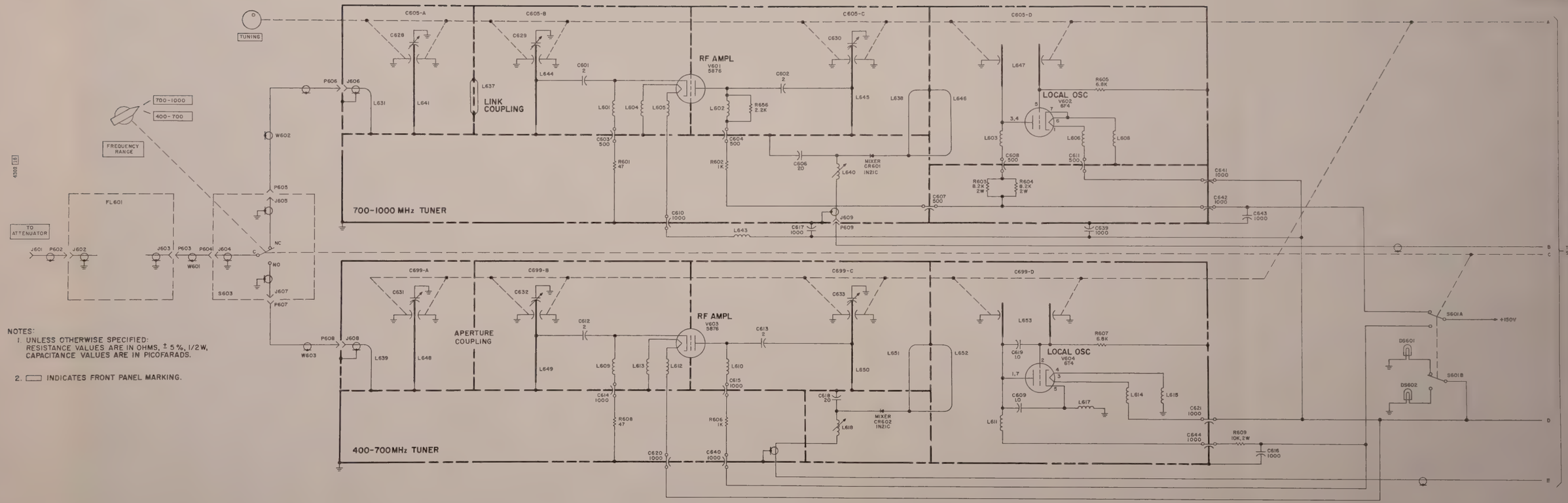


Figure 5-10. Model T-2 NF-105 M-126 Tuning Unit, Schematic Diagram (Sheet 2 of 2)



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/2W,
   CAPACITANCE VALUES ARE IN PICOFARADS.

2. ▭ INDICATES FRONT PANEL MARKING.

Figure 5-11. Model T-3/NF-105 Tuning Unit, Schematic Diagram (Sheet 1 of 2)

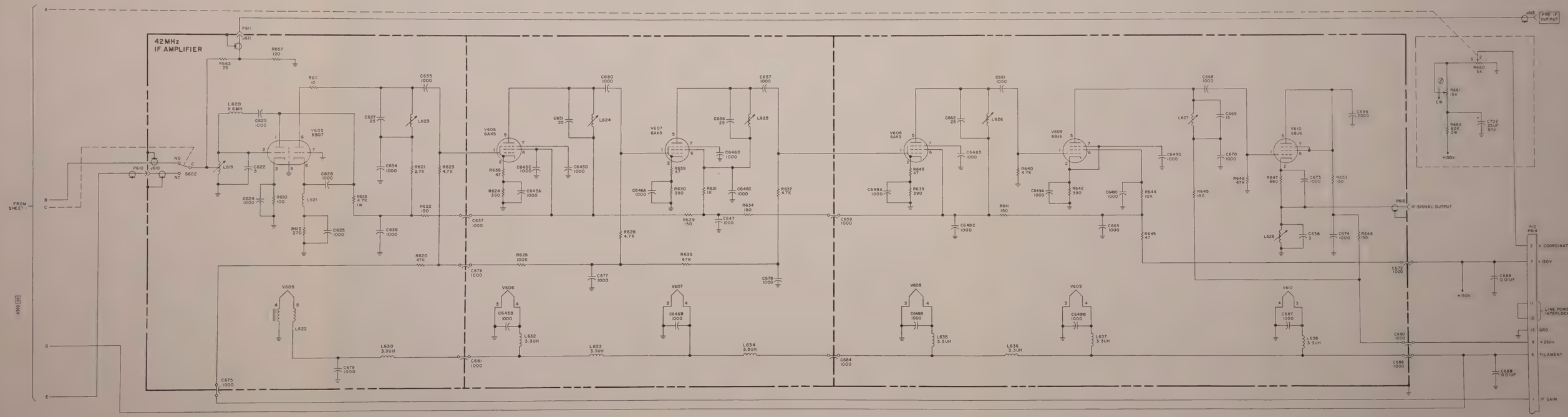
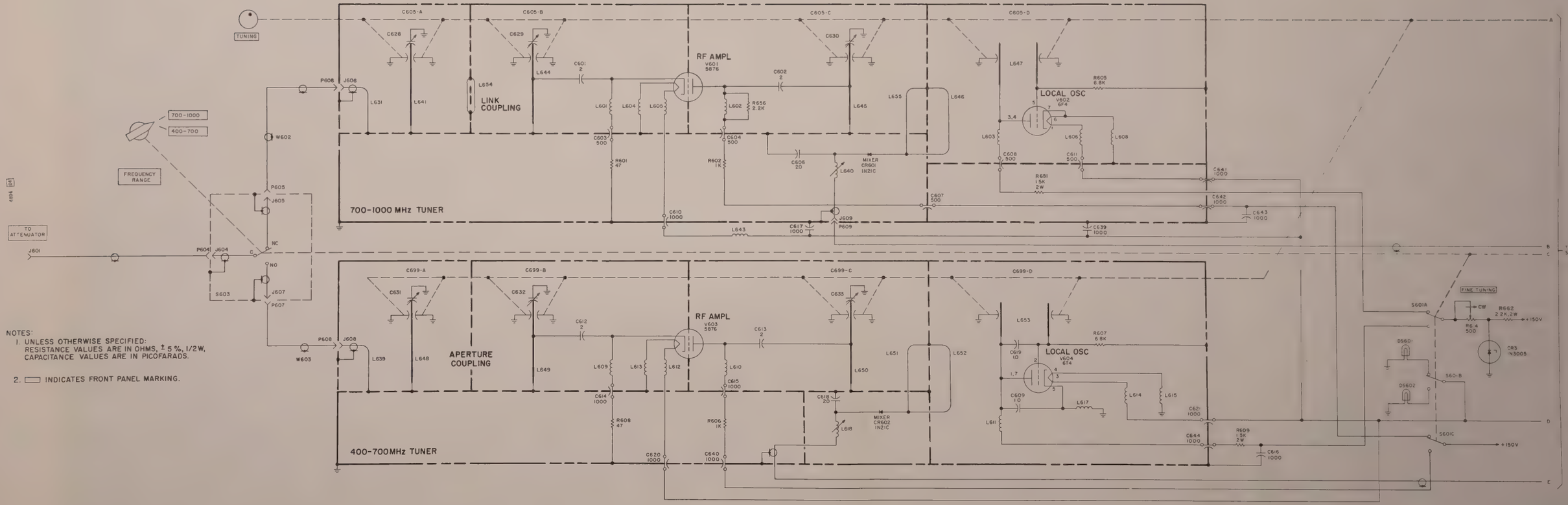


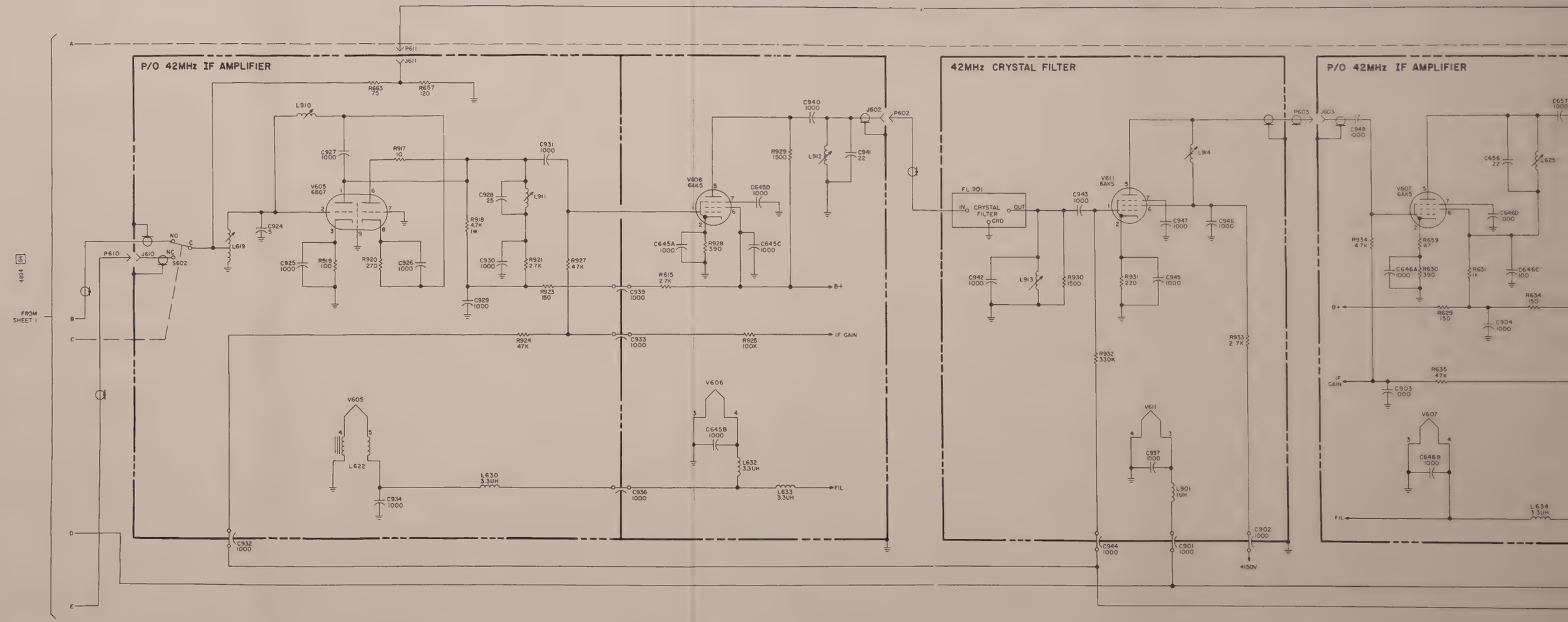
Figure 5-11. Model T-3/NF-105 Tuning Unit, Schematic Diagram (Sheet 2 of 2)



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5 %, 1/2W,
   CAPACITANCE VALUES ARE IN PICOFARADS.

2. ▭ INDICATES FRONT PANEL MARKING.

Figure 5-12. Model T-3/NF-105/M-126
Tuning Unit, Schematic Diagram
(Sheet 1 of 2)


P/O 42MHz IF AMPLIFIER
42MHz CRYSTAL FILTER
P/O 42MHz IF AMPLIFIER
FROM SHEET 1
P611
J611
R663 75
R657 120
L910
C927 1000
R917 10
C931 1000
V605 6BQ7
C928 25
L911
R918 47K 1W
C930 1000
R921 2.7K
R927 47K
C929 1000
R923 150
C925 1000
R919 100
R920 270
C926 1000
C924 5
L619
P610
J610
S602
NO
NC
C
R615 2.7K
V606 6AK5
C645D 1000
C645A 1000
R928 390
C645C 1000
C940 1000
R929 1500
L912
C941 22
J602
P602
B+
C939 1000
IF GAIN
R924 47K
C933 1000
R925 100K
V605
L622
C934 1000
L630 3.3UH
V606
C645B 1000
L632 3.3UH
L633 3.3UH
FIL
C936 1000
C932 1000
FL 901
IN
CRYSTAL FILTER
GRD
OUT
C943 1000
V611 6AK5
L914
C947 1000
C946 1000
C942 1000
L913
R930 1500
R931 220
C945 1000
R932 330K
R933 2.7K
V611
C937 1000
L901 1UH
C944 1000
C901 1000
C902 1000
+150V
P603
J603
C948 1000
C657 1000
C656 22
L625
V607 6AK5
C646D 000
R934 47K
R659 47
C646A 1000
R630 390
R631 1K
C646C 100
R634 150
B+
R629 150
C904 1000
IF GAIN
R635 47K
C903 000
V607
C646B 1000
FIL
L634 3.3UH

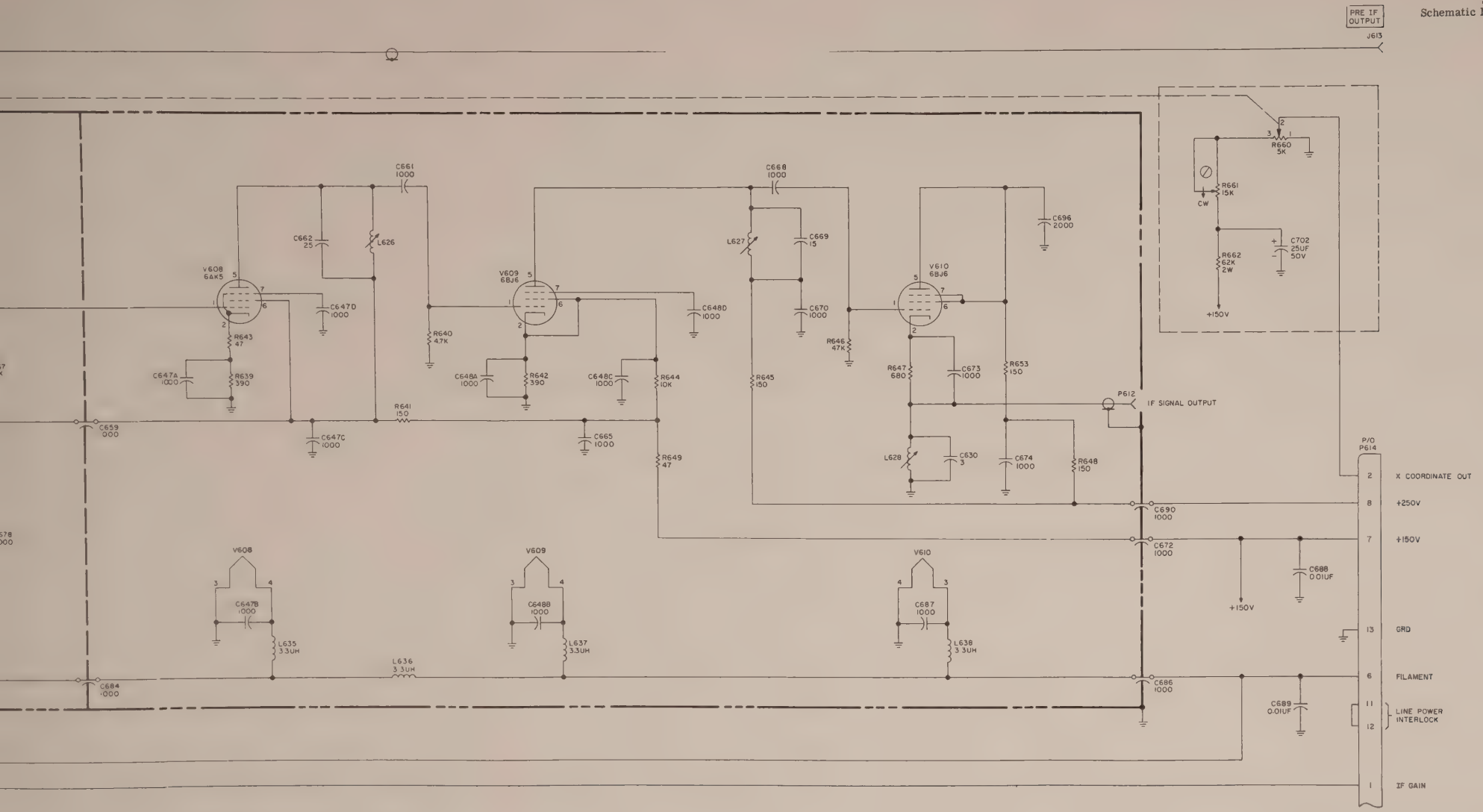


Figure 5-12. Model T-3/NF-105/M-126 Tuning Unit, Schematic Diagram (Sheet 2 of 2)

SECTION VI
PARTS LIST

6-1. INTRODUCTION.

6-2. This parts list section includes all pertinent data necessary to locate, identify, and procure additional parts for the equipment. Parts are listed alpha-numerically by reference symbol and include all replaceable items such as electronic, electro-mechanical, and mechanical parts of the equipment. In some cases, values, ratings and manufacturer sources shown are nominal and variations may be found. Satisfactory replacement may be made with either the listed component or an exact replacement of the part(s) removed from the equipment.

6-3. ORDERING INFORMATION.

6-4. The following instructions will aid in ordering parts from the Parts List, tables 6-2 through 6-7.

a. Address all inquiries or orders to:

CUSTOMER SERVICE
Department 500-1
The Singer Company
Metrics Division
915 Pembroke Street
Bridgeport, Connecticut 06608

b. Include the following information:

1) Model and Serial Number of instrument.

2) Singer Part Number.

3) Reference Symbol Number.

4) Description (as shown on list)

6-5. HOW TO USE THE PARTS LIST.

6-6. Paragraphs 6-7 through 6-11 describe the use and meaning of the five columns included in the parts list (see figure 6-1).

6-7. REF SYMBOL COLUMN. The Ref Symbol Column (1, figure 6-1) contains a alpha-numerical listing of parts as they appear on equipment chassis, illustration, or schematic. The reference designation identifies the parts as to their component function in the instrument.

6-8. DESCRIPTION COLUMN. The Description Column (2, figure 6-1) contains the identification of component parts including all pertinent specifications and Singer part number. When the description column is used for a part which is identical to a part which has already been described: SAME AS (3) is used along with the reference symbol of the previously used part. In these instances, columns 3, 4, 5, are left blank. When the description column is used for a part that is used in only the standard version of the NF-105: USED IN STD ONLY (4) will appear in the Description Column. Similarly, USED IN M-126 ONLY appears in the Description Column when a part is used only in the M-126 version of the NF-105.

6-9. MANUFACTURER'S PART NUMBER COLUMN. The Manufacturer's Part Number Column (5, figure 6-1) contains the part number as designated by the manufacturer of the part.

6-10. MFR'S CODE COLUMN. The Mfr's Code column (6, figure 6-1) references the manufacturer by an assigned code number as listed in Federal Supply Code Handbook H4-2. For manufacturers not listed in H4-2, a letter code will be assigned. Table 6-1 includes the manufacturer and his code designation.

6-11. MAINT QTY COLUMN. The Maint Qty column (7, figure 6-1) contains the number of additional components recommended to keep the equipment at an optimum performance level. The recommended number of components in the Maint Qty column is based on 2000 hours of equipment operation.

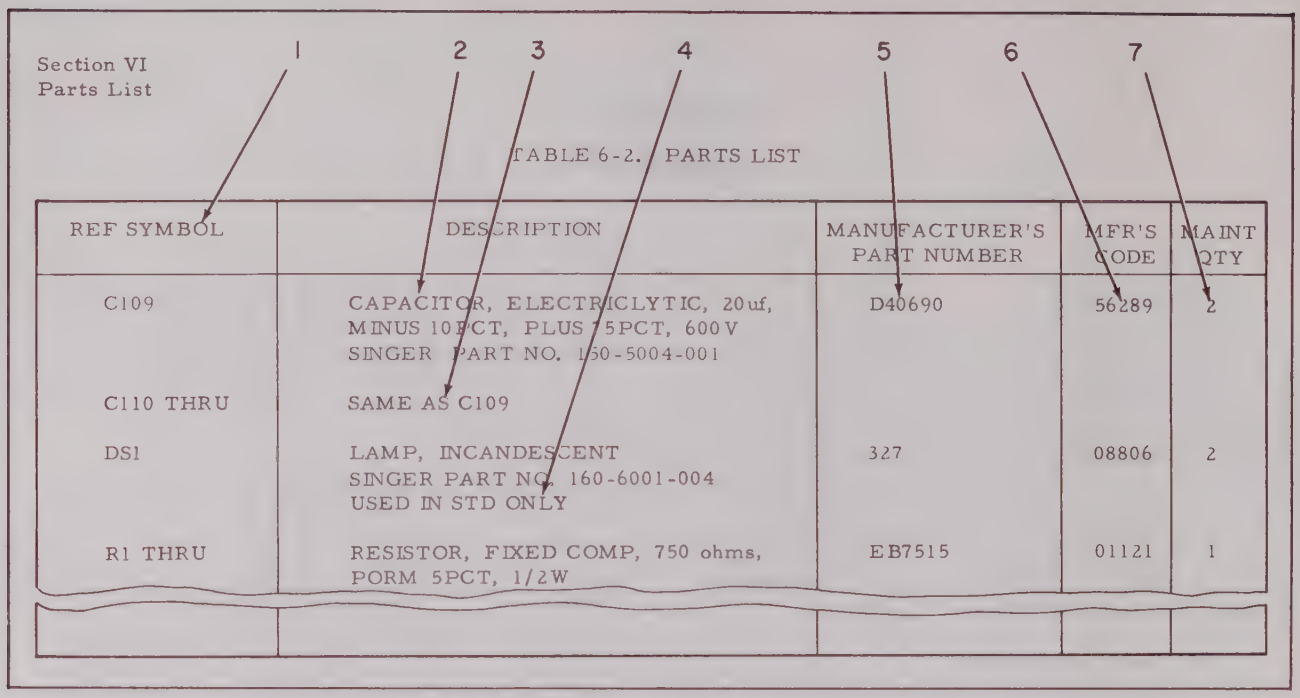


Figure 6-1. Parts List Sample

TABLE 6-1. MANUFACTURER'S CODE

Number	Name
00656	Aerovox Corp. New Bedford, Mass.
00853	Sangamo Electric Co. Pickens Division Pickens, S.C.
01121	Allen-Bradley Co. Milwaukee, Wis.
02660	Amphenol-Borg Electronics Corp. Maywood, Ill.
03045	Nytronics, Inc. Ortho Filter Division Paterson, N.J.
06124	P.R. Mallory and Co. Inc. Lakewood, Calif.
08806	General Electric Co. Miniature Lamp Department Cleveland, Ohio
09023	Cornell-Dubilier Electric Corp. Electrolytics and Paper Tubular Division Sanford, N.C.

Number	Name
12126	Kidco Inc. Medford, N.J.
14655	Cornell-Dubilier Electric Corp. Newark, N.J.
14841	Ward Leonard Electric Co. Hagerstown, Md.
16119	Charles T. Gamble Ind. Riverside, N.J.
16665	The Singer Company Metrics Division Bridgeport, Conn.
18083	Clevite Corp. Semiconductor Division Palo Alto, Calif.
19048	Amphenol Eastern Division of Amphenol-Borg Electronics Corp. Fairlawn, N.J.
24455	General Electric Co. Lamp Division Nela Park, Cleveland, Ohio

TABLE 6-1. MANUFACTURER'S CODE (Cont'd)

Number	Name
56289	Sprague Electric Co. North Adams, Mass.
63743	Ward Leonard Electric Co. Mount Vernon, N.Y.
71400	Bussmann Mfg. Division of McGraw Edison Co. St. Louis, Mo.
71450	CTC Corp. Elkhart, Ind.
71482	C.P. Clare and Co. Chicago, Ill.
71590	Centralab Division of Globe-Union Inc. Milwaukee, Wis.
71785	Cinch Mfg. Co. and H.B. Jones Division Chicago, Ill.
72136	Electro-Motive Mfg. Co. Inc. Willimantic, Conn.
72619	Dialight Corp. Brooklyn, N.Y.
72982	Erie Technological Products Inc. Erie, Pa.
73559	Carling Electric Inc. Hartford, Conn.
74970	E.F. Johnson Co. Waseca, Minn.
78488	Stackpole Carbon Co. St. Marys, Pa.
79727	Continental-Wirt Electronics Corp. Philadelphia, Pa.
80294	Bourns Inc. Riverside, Calif.

Number	Name
81349	Military Specifications
81640	Controls Company of America Control Switch Division Folcroft, Pa.
82116	Electric Regulator Corp. Norwalk, Conn.
82142	Jeffers Electronics Division of Speer Carbon Co. DuBois, Pa.
82389	Switchcraft Inc. Chicago, Ill.
89536	John Fluke Mfg. Co. Inc. Seattle, Wash.
91662	Elco Corp. Willow Grove, Pa.
91712	Gaertner Radio Co. Los Angeles, Calif.
91737	Gremar Mfg. Co. Inc. Wakefield, Mass.
94310	TRU-OHM Products Memcor Components Division Huntington, Ind.
95712	Dage Electric Co, Inc. Franklin, Ind.
98291	Sealectro Corp. Mamaroneck, N.Y.
99800	Delevan Electronics Corp. East Aurora, N.Y.
A	Dale Resistor Co. Columbus, Nebraska

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
CR2	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-041	IN34	81349	1
CR4	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-046	IN251	81349	1
C138	CAPACITOR,FIXED,DIPPED MICA, 0.01 UF, PORM 10 PCT,500V SINGER PART NO. 556125-058	DM30E103K0500WV4CR	72136	1
C144	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,500V SINGER PART NO. 556081-084	DA048-248K	71590	1
C149 AND C150	CAPACITOR,FIXED,MICA, 200 PF,PORM 5 PCT SINGER PART NO. 556079-008	CM15E201J	72136	1
C151	CAPACITOR,FIXED,MICA, 1000 PF,PORM 1 PCT SINGER PART NO. 556084-002	CM20E102F	72136	1
C152 AND C153 C153	CAPACITOR,FIXED,MICA, 100 PF,PORM 5 PCT SINGER PART NO. 556076-013	CM15D101J	72136	1
C154 AND C155	CAPACITOR,FIXED,CERAMIC DISC, 1000 PF,1000V SINGER PART NO. 556060-142	40C214	56289	1
C156	CAPACITOR,FIXED,CERAMIC, 1000 PF,PORM 20 PCT 500V SINGER PART NO. 556060-141	C15-2	00656	1
C157	CAPACITOR,FIXED,CERAMIC, 100 PF,PORM 20 PCT, 500V SINGER PART NO. 556060-139	C15-1	00656	1
C158	CAPACITOR,BATHTUB, 0.5 UF,600V SINGER PART NO. 556074-070	CP53BIEF504V	81349	1
C159	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,GMV, 500V SINGER PART NO. 150-1002-103PHF	811Z5S103PFGMV	72982	1
C160	SAME AS C154			
C161	SAME AS C159			
C162	CAPACITOR,FIXED,MICA, 250 PF,PORM 5 PCT SINGER PART NO. 556081-091	CM19B251J	72136	1
C163	CAPACITOR,ELECTROLYTIC, 25 UF,50V SINGER PART NO. 556074-099	CE63B250G	00656	1
C183 AND C184	SAME AS C138			
C185	CAPACITOR,FIXED,MICA, 2000 PF,PORM 2 PCT SINGER PART NO. 556081-077	CM20E202G	72136	1
C186	CAPACITOR,FIXED,MICA, 180 PF,PORM 2 PCT SINGER PART NO. 556079-042	CM15E181G	72136	1
C187	CAPACITOR,VARIABLE, 4 TO 30 PF SINGER PART NO. 556074-115	503-000-D2PO-24R	72982	1
C189	SAME AS C138			
C190	SAME AS C185			
C191	SAME AS C186			

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C192 C193	AND	SAME AS C144			
C194		CAPACITOR,ELECTROLYTIC, 50 UF,250V SINGER PART NO. 556074-102	CE41C500M	00656	1
C195 C197	THRU	CAPACITOR,ELECTROLYTIC, 2 X 35 UF,400V SINGER PART NO. 556074-101	CE42C350Q	56289	1
C199 C200	AND	SAME AS C194			
C203 C204	AND	CAPACITOR,FIXED,PAPER,METAL CASE, 2 UF, PORM 10 PCT,600V SINGER PART NO. 556074-080	TJH-6020	09023	1
C206		CAPACITOR,FIXED,MICA, 100 PF,PORM 5 PCT SINGER PART NO. 556078-012	CM15C101J	72136	1
C207		NON-REPLACEABLE PART OF IMPULSER			
C208		CAPACITOR,FIXED,DIPPED MICA, 10 PF, PORM 5 PCT,500V SINGER PART NO. 150-2002-100CJO	DM15C100J0500WV4CR	72136	1
C210 C211	AND	SAME AS C154			
C219 C220	AND	CAPACITOR,1000 PF,500V SINGER PART NO. 556099-016	SST-SI-1-1000PF,GMV	00656	1
C221		CAPACITOR,FIXED,PAPER, 0.47 UF,PORM 20 PCT, 400V SINGER PART NO. 556074-068	196P4704S13	56289	1
C227 C228	AND	SAME AS C144			
C229 C230	AND	SAME AS C208			
C231		CAPACITOR,FIXED,DIPPED MICA, 820 PF, PORM 5 PCT,100V SINGER PART NO. 150-2003-821FJO	DM19F821J0100WV4CR	72136	1
C232		CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,250V SINGER PART NO. 556060-146	DA140-172B	71590	1
C233		CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 75 PCT, MINUS 10 PCT,12V SINGER PART NO. 150-5001-250CS	TYPE 30D	56289	1
DS1		LAMP,PILOT SINGER PART NO.556002-006	47	24455	2
FL1 FL2	AND	NON-REPLACEABLE PART OF J17			
FL3		NON-REPLACEABLE PART OF J15			
FL4		FILTER, AC INPUT	004186-001	16665	1
FL6 FL7	AND	AC LINE FILTER	006933-002	16665	1
FL8		FILTER,REGULATOR,FEED-BACK	006933-001	16665	1
F1		FUSE, 1.6AMPS SINGER PART NO. 556006-117	MDL-1.6	71400	3

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
J1	CONNECTOR,JACK SINGER PART NO. 556010-159	UG-291/U	81349	1
J2 THRU J11	NON-REPLACEABLE PARTS OF SIGNAL INPUT ATTEN.			
J12	SAME AS J1			
J13	CONNECTOR,JACK SINGER PART NO. 168-4029-001	1-429-1 /W/NT-34	95712	1
J14	SAME AS J1			
J15	JACK AND FILTER ASSY	004464-001	16665	1
J16	CONNECTOR,JACK, 15 PIN	009576-001	16665	1
J17	JACK AND FILTER ASSY	061761-001	16665	1
J18	SAME AS J1			
J19	CONNECTOR,JACK SINGER PART NO. 556016-363	MS3102A14S-1P	81349	1
J20	CONNECTOR,JACK	003474-001	16665	1
J21	NON-REPLACEABLE PART OF IMPULSER			
J22 THRU J34	NON-REPLACEABLE PART OF IMPULSE GENERATOR ATTENUATOR			
K1	RELAY,DPDT SINGER PART NO. 556019-277	A316028	71482	1
L58	NON-REPLACEABLE PART OF IMPULSER			
L59A AND L59B	FILTER	002979-001	16665	1
MP100	IMPULSER CONTACTOR,POINTED	3010	16665	1
MP101	IMPULSER CONTACTOR,FLAT	3011	16665	1
M1	METER,1 MA USED IN STD ONLY	002334-002	16665	1
M1	METER,100 MICROAMPS USED IN M-126 ONLY	002334-001	16665	1
M3	METER,IMPULSE GEN. OUTPUT	556013-022	16665	1
P1 AND P2	NON-REPLACEABLE PART OF SIGNAL INPUT ATTEN.			
P3	CONNECTOR,PLUG SINGER PART NO. 556016-330	UG-536A/U	81349	1
P4 AND P5	NON-REPLACEABLE PART OF IMPULSE GENERATOR ATTENUATOR			
R55	RESISTOR,FIXED,COMP. 470 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-471J USED IN M-126 ONLY	EB4715	01121	1
R56	RESISTOR,FIXED,COMP., 250 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-251J USED IN M-126 ONLY	EB2515	01121	1
R71	RESISTOR,FIXED,COMP. 100K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-104J	EB1045	01121	2
R72	RESISTOR,FIXED,COMP. 220K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-224J	EB2245	01121	2

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R73	RESISTOR,FIXED,COMP. 47K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-473J	EB4735	01121	2
R74	SAME AS R72			
R76	SAME AS R72			
R77	RESISTOR,FIXED,COMP. 22K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-223J	EB2235	01121	1
R78	SAME AS R73			
R79	SAME AS R77			
R80	RESISTOR,VARIABLE, 50K OHMS,PORM 10 PCT,2W	151-0007-072	16665	1
R81	RESISTOR,VARIABLE, 25K OHMS,PORM 10 PCT,2W	151-0007-067	16665	1
R82	SAME AS R71			
R83	RESISTOR,FIXED,COMP. 1K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	2
R84	RESISTOR,FIXED,COMP. 470K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-474J	EB4745	01121	1
R85	RESISTOR,FIXED,COMP. 270 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-271J	EB2715	01121	1
R86	RESISTOR,FIXED,PREC., 50 MEGOHMS,PORM 2 PCT, 1W SINGER PART NO. 556146-351	TYPE RN-75MC-1	A	1
R87	SAME AS R83			
R88	RESISTOR,FIXED,COMP. 200 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-201J	EB2015	01121	1
R89	RESISTOR,FIXED,COMP. 20K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-203J	HB2035	01121	1
R90	RESISTOR,VARIABLE, 10K OHMS,PORM 10 PCT,2W	151-0007-066	16665	1
R91	SAME AS R83			
R92	SAME AS R89			
R93	SAME AS R83			
R95	RESISTOR,FIXED,PREC., 620 OHMS,PORM 1 PCT, 1/2W SINGER PART NO. 556029-445	TYPE NA15	79727	1
R96	RESISTOR,FIXED,PREC., 5.4K OHMS,PORM 1 PCT, 1/2W SINGER PART NO. 556029-389	TYPE NA15	79727	1
R97	RESISTOR,FIXED,PREC., 16.6K OHMS,PORM 1 PCT, 1/2W SINGER PART NO. 556029-402	TYPE NA15	79727	1
R98	RESISTOR,FIXED,COMP., 150K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-154J	EB1545	01121	1
R99	RESISTOR,VARIABLE, 2.5K OHMS,PORM 10 PCT,2W	151-0007-064	16665	1
R101	RESISTOR,VARIABLE, 10K OHMS,PORM 10 PCT,2W	151-0007-066	16665	1
R103	RESISTOR,FIXED,COMP. 330K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-334J	EB3345	01121	1

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R104	RESISTOR,FIXED,COMP. 180K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-184J	EB1845	01121	1
R105	RESISTOR,VARIABLE, 25K OHMS SINGER PART NO. 556056-052	TYPE 20A	89536	1
R106	SAME AS R71			
R121	RESISTOR,FIXED,COMP. 390K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-394J	EB3945	01121	1
R122	RESISTOR,VAIRABLE,DUAL, 5 MEGOHMS	JD2N108P505TA	01121	1
R123 AND R124	SAME AS R73			
R125	SAME AS R121			
R127	RESISTOR,FIXED,COMP. 10K OHMS,PORM 5 PCT 1W SINGER PART NO. 151-1004-103J	GB1035	01121	1
R128	RESISTOR,FIXED,COMP. 4.7 MEGOHMS PORM 5 PCT 1/2W SINGER PART NO. 151-1003-475J	EB4755	01121	1
R129	RESISTOR,FIXED,COMP. 3.3K OHMS,PORM 5 PCT 1W SINGER PART NO. 151-1004-332J	GB3325	01121	1
R130	SAME AS R128			
R132	RESISTOR,FIXED,COMP. 2.2 MEGOHMS PORM 5 PCT 1/2W SINGER PART NO. 151-1003-225J	EB2255	01121	2
R133	RESISTOR,FIXED,COMP. 1 MEGOHMS PORM 5 PCT 1/2W SINGER PART NO. 151-1003-105J	EB1055	01121	2
R135	SAME AS R55			
R136 AND R137	RESISTOR,FIXED,COMP. 10K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1004-103J	GB1035	01121	1
R138	RESISTOR,VARIABLE, 25K OHMS,PORM 10 PCT,2W	151-0007-070	16665	1
R139 AND R140	SAME AS R136			
R143	SAME AS R133			
R144	SAME AS R132			
R145	SAME AS R55			
R146	RESISTOR,FIXED,COMP. 10 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-100J	EB1005	01121	1
R147	NON-REPLACEABLE PART OF IMPULSER			
R149	RESISTOR,FIXED,WIRE-WOUND, 2 OHMS, PORM 10 PCT,10W SINGER PART NO. 556029-487	AR10-2	94310	1
R150	RESISTOR,FIXED,COMP. 100 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-101J	EB1015	01121	1
R152	SAME AS R83			
R153	RESISTOR,FIXED,COMP. 1.2K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-U22J	HB1225	01121	1

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R154	RESISTOR,FIXED,COMP. 47 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	1
R155	RESISTOR,FIXED,COMP. 2.2K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-222J	HB2225	01121	1
R156	RESISTOR,FIXED,COMP. 620 OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-621J	HB6215	01121	1
R157	SAME AS R153			
R158	SAME AS R150			
R159	RESISTOR,FIXED,COMP. 4.7K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-472J	EB4725	01121	1
R160	RESISTOR,FIXED,WIRE-WOUND, 10K OHMS,25W SINGER PART NO. 556029-494	FR25-10	94310	1
R161	RESISTOR,FIXED,COMP. 390K OHMS,PORM 5 PCT 1W SINGER PART NO. 151-1004-394J	GB3945	01121	1
R162	RESISTOR,FIXED,COMP. 10K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	1
R163	RESISTOR,VARIABLE, 100K OHMS,PORM 10 PCT,2W	151-0007-073	16665	1
R164	RESISTOR,FIXED,PREC., 300K OHMS,PORM 1 PCT, 1W SINGER PART NO. 556034-292	TYPE NR25	79727	1
R165	RESISTOR,FIXED,COMP. 6.8K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-682J	EB6825	01121	1
R168	NON-REPLACEABLE PART OF VR1			
R169	RESISTOR,FIXED,COMP. 7.5K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-752J	HB7525	01121	1
R170	RESISTOR,VARIABLE, 5K OHMS,PORM 10 PCT,2W	151-0007-065	16665	1
R180	SAME AS R155			
R189 THRU R206	NON-REPLACEABLE PART OF SIGNAL INPUT ATTEN.			
R207 THRU R227	NON-REPLACEABLE PART OF IMPULSE GENERATOR ATTENUATOR			
R236 THRU R238	NON-REPLACEABLE PART OF IMPULSE GENERATOR ATTENUATOR			
R239	RESISTOR,FIXED,COMP. 56 OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-560J	HB5605	01121	1
R249 THRU R251	NON-REPLACEABLE PART OF IMPULSE GENERATOR ATTENUATOR			
R253 AND R254	RESISTOR,FIXED,COMP. 15K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-153J	EB1535	01121	2
R257	RESISTOR,FIXED,WIRE-WOUND, 5 OHMS,10W SINGER PART NO. 556033-242	FR10-5	94310	1
R258	RESISTOR,FIXED,WIRE-WOUND, 20 OHMS,10W SINGER PART NO. 556043-057	FR10-20	94301	1

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R259	RESISTOR,FIXED,WIRE-WOUND, 50 OHMS,10W SINGER PART NO. 556033-267	FR10-50	94301	1
R260	RESISTOR,FIXED,WIRE-WOUND, 75 OHMS,10W SINGER PART NO. 556034-195	FR10-75	94301	1
R261	RESISTOR,FIXED,WIRE-WOUND, 125 OHMS,10W SINGER PART NO. 556034-202	FR10-125	94301	1
R262	RESISTOR,FIXED,WIRE-WOUND, 200 OHMS,10W SINGER PART NO. 556034-324	FR10-200	94301	1
R263	RESISTOR,FIXED,WIRE-WOUND, 225 OHMS,10W SINGER PART NO. 556034-209	FR10-225	94301	1
R264	RESISTOR,FIXED,WIRE-WOUND, 250 OHMS,10W SINGER PART NO. 556034-211	FR10-250	94301	1
R265	RESISTOR,FIXED,WIRE-WOUND, 300 OHMS,10W SINGER PART NO. 556034-215	FR10-300	94301	1
R266	RESISTOR,FIXED,WIRE-WOUND, 54 OHMS,50W SINGER PART NO. 556034-302	FR50-54	94301	1
R272	RESISTOR,FIXED,COMP. 18K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-183J	EB1835	01121	1
R273	SAME AS R154			
R277	RESISTOR,FIXED,PREC., 1.5K OHMS,PORM 1 PCT, 1/2W SINGER PART NO. 151-1008-B1501F	C1/2E1500OHMPORM1PCT	12126	1
R280	SAME AS R73			
R281 AND R282	SAME AS R71			
R283	SAME AS R75			
R284	RESISTOR,FIXED,COMP. 39 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-390J	EB3905	01121	1
R285	SAME AS R159			
S2	SWITCH,ROTARY, 4 SECT, 7 POLE, 5 THROW	002466-001	16665	1
S3	SWITCH,ROTARY	002016-001	16665	1
S4	SWITCH,TOGGLE,SPST SINGER PART NO. 556019-073 USED IN STD ONLY	TYPE ST42C	81349	1
S4	SWITCH,TOGGLE, SPST SINGER PART NO. 556019-296 USED IN M-126 ONLY	13036T	82389	1
S5	SWITCH,ROTARY, 1 SECT, 2 POLE, 3 THROW	002870-001	16665	1
S6	SWITCH,TOGGLE SINGER PART NO. 556019-060	ST52R	81349	1
S7	SWITCH,TOGGLE, SPST SINGER PART NO. 556019-078	TYPE ST420	81349	1
S8	SAME AS S4			
S9	SWITCH,MICRO	149-0102-001	16665	1

TABLE 6-2. PARTS LIST, MODELS BA-105 AND BA-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
T10	TRANSFORMER,AUDIO OUTPUT	002981-001	16665	1
T11	TRANSFORMER,POWER	002980-001	16665	1
VR1	VOLTAGE REGULATOR SINGER PART NO. 556016-287	VTX-10	82116	1
V18	ELECTRON TUBE SINGER PART NO. 556027-072	6AL5	81349	1
V19	ELECTRON TUBE SINGER PART NO. 556027-017	12AT7	81349	1
V20	ELECTRON TUBE SINGER PART NO. 556027-020	12AU7	81349	4
V21	ELECTRON TUBE SINGER PART NO. 556027-253	6DJ8	81349	1
V23 THRU V25	SAME AS V20			
V26 THRU V30	ELECTRON TUBE SINGER PART NO. 556027-119	6X4	81349	4
V31	ELECTRON TUBE SINGER PART NO. 556027-003	OA2	81349	1
XDS1	LAMP,SOCKET SINGER PART NO. 556002-305	81410-111/RED/	72619	1
XF1	HOLDER,FUSE SINGER PART NO. 556006-020	HKP-ORL	71400	1
XV18	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	81349	1
XV19	SOCKET,TUBE SINGER PART NO. 556024-269	TS103C01	81349	1
XV20	SOCKET,TUBE SINGER PART NO. 556024-019	TS103P01	81349	1
XV21	SAME AS XV19			
XV23 THRU XV25	SAME AS XV20			
XV26 THRU XV31	SAME AS XV18			

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
CR900	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-041	IN34	81349	1
CR901 AND CR902	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-186	CGD-146	18083	1
C900	CAPACITOR,AIR DIELECTRIC	004925-001	16665	1
C901 THRU C903	CAPACITOR,VARIABLE, 5 TO 25 PF,NPO,350V SINGER PART NO. 556122-025	557-000-NPO-5-25	72982	2
C904	CAPACITOR,FIXED,MICA DIPPED, 110 PF, PORM 5 PCT,500 V SINGER PART NO. 150-2002-111FJO	DM15F111JO500WV4CR	72136	1
C905	CAPACITOR,FIXED,CERAMIC DISC, 1000PF,GMV, 1000V SINGER PART NO. 556060-142	40C214	56289	1
C906	CAPACITOR,FIXED,CERAMIC, 0.022 UF, PORM 20 PCT,500V SINGER PART NO. 556081-086	5GAB-S22	56289	1
C907	CAPACITOR,FIXED,DIPPED MICA, 56 PF, PORM 5 PCT,500V SINGER PART NO. 556125-033	DM15E560J0500WV4CR	72136	1
C908	CAPACITOR,FIXED,CERAMIC DISC, 0.05 UF,PLUS 80 PCT,MINUS 20 PCT,200V SINGER PART NO. 556074-057	33C137	56289	2
C909	CAPACITOR,ELECTROLYTIC, 12 UF,350V SINGER PART NO. 556116-008	E16D101	00656	1
C910	CAPACITOR,ELECTROLYTIC, 22 UF,PORM 20 PCT, 150V SINGER PART NO. 556074-097	150D22X0015B2	56289	1
C911 THRU C913	SAME AS C901			
C914	SAME AS C908			
C915 THRU C918	CAPACITOR,FIXED,MICA DIPPED, 2020 PF, PORM 2 PCT,500V SINGER PART NO. 556125-054	DM19E2021G0500WV4CR	72136	1
C919	CAPACITOR,FEED-THRU, 0.047 UF,PORM 20 PCT, 200V SINGER PART NO. 556081-089	102P17	56289	1
C920	CAPACITOR,FEED-THRU, 0.1 UF,PORM 20 PCT,100V SINGER PART NO. 556116-016	102P21	56289	1
C921 THRU C923	SAME AS C901			
C924 THRU C926	NON-REPLACEABLE PART OF FL-900			
C927	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,GMV, 250V SINGER PART NO. 556060-146	DA140-172B	71590	3
C928	CAPACITOR,FEED-THRU, 500 PF,PORM 20 PCT,500V SINGER PART NO. 556081-093	DA-785-014Q	71590	2
C929	SAME AS C905			
C930	CAPACITOR,FIXED,MICA DIPPED, 1000 PF, PORM 2 PCT,100V SINGER PART NO. 150-2002-102EGO	DM15E102G0100WV4CR	72136	1

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C931	AND	SAME AS C927			
C932					
C933		SAME AS C928			
C934		SAME AS C927			
C935		SAME AS C908			
C936		CAPACITOR,FIXED,MICA DIPPED, 820 PF, PORM 2 PCT,300V SINGER PART NO. 150-2002-821EGO	DM15E821G0300WV4CR	72136	1
C937		CAPACITOR,FIXED,MICA DIPPED, 43 PF, PORM 2 PCT,500V SINGER PART NO. 150-2002-430EGO	DM15E430G0500WV4CR	72136	1
C938		SAME AS C927			
C939		SAME AS C928			
C940		SAME AS C927			
C941	THRU	CAPACITOR,VARIABLE, 5 TO 30 PF,N750,350V SINGER PART NO. 556122-065	557-000-750-5-30	72982	1
C943					
C944		SAME AS C936			
C945		SAME AS C908			
C946		SAME AS C936			
C947		SAME AS C925			
C948	THRU	SAME AS C927			
C950					
C951		SAME AS C928			
C952		SAME AS C908			
C953	AND	SAME AS C936			
C954					
C955	AND	SAME AS C927			
C956					
C957		SAME AS C908			
C958		SAME AS C927			
C959		SAME AS C936			
C960	AND	SAME AS C928			
C961					
C962		CAPACITOR,FIXED,MICA DIPPED, 110 PF, PORM 5 PCT,500V SINGER PART NO. 151-2002-111EJO	DM15E111J0500WV4CR	72136	1
C963		CAPACITOR,FIXED,CERAMIC, 15 PF,PORM 10 PCT, 500V SINGER PART NO. 556060-115	CC20CH150K	81349	1
C964		SAME AS C928			
C965		SAME AS C920			

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C966	SAME AS C963			
C967	SAME AS C908			
C968	SAME AS C962			
C969 AND C970	SAME AS C963			
C971	SAME AS C908			
C972	SAME AS C919			
C973	SAME AS C908			
C974	CAPACITOR,FIXED,CERAMIC, 150 PF,PORM 2 PCT, 500V SINGER PART NO. 556060-174	CC25UJ151G	81349	1
C975	CAPACITOR,FIXED,MICA DIPPED, 82 PF, PORM 5 PCT,500V SINGER PART NO. 150-2002-820EJO	DM15E820J0500WV4CR	82136	2
C976	CAPACITOR,FIXED,MICA DIPPED, 56 PF, PORM 2 PCT,500V SINGER PART NO. 150-2002-560EGO	DM15E560G0500WV4CR	72136	1
C977	CAPACITOR,FIXED,MICA DIPPED, 90 PF, PORN 2 PCT,500V SINGER PART NO. 150-2002-900EGO	DM15E900G0500WV4CR	72136	1
C978	CAPACITOR,FIXED,MICA DIPPED, 250 PF, PORM 2 PCT,500V SINGER PART NO. 150-2002-251EGO	DM15E251G0500WV4CR	72136	1
C979	SAME AS C936			
C980	CAPACITOR,FIXED,MICA DIPPED, 24 PF, PORM 0.5 PF,500V SINGER PART NO. 150-2002-240CDO	DM15C240D0500WV4CR	72136	1
C981	SAME AS C927			
C982	SAME AS C928			
C983	SAME AS C927			
C984	SAME AS C975			
C985	SAME AS C908			
C986	CAPACITOR,FIXED,MICA DIPPED, 150PF, PORM 2 PCT,500V SINGER PART NO. 151-2002-151EGO	DM15E151G0500WV4CR	72136	1
C987	CAPACITOR,FIXED,PAPER,0.47 UF,PORM 20 PCT, 100V SINGER PART NO. 556074-065	78P47401S15	56289	1
C988	CAPACITOR,FIXED, 4.7 PF,PORM 10 PCT SINGER PART NO. 151-4001-4R7K	TYPE GA	78488	1
C989	SAME AS C908			
C990	SAME AS C928			
C991	CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 150 PCT, MINUS 10 PCT,50V SINGER PART NO. 556074-168	NLW-25-50	09023	1

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C992	SAME AS C927			
DS900 THRU DS902	LAMP,PILOT SINGER PART NO. 556002-006	47	72619	5
FL-900	FILTER ASSY	103-0063-001	16665	1
J900	CONNECTOR,JACK SINGER PART NO. 556010-158	UG-290A/U	81349	1
J901	CONNECTOR,JACK SINGER PART NO. 556016-313	UG-296/U	81349	1
J903	CONNECTOR,JACK SINGER PART NO. 556010-159	UG-291/U	81349	1
J906	SAME AS J903			
J908	CONNECTOR,JACK SINGER PART NO. 556010-261	51-043-0000	98291	1
J909	CONNECTOR,JACK SINGER PART NO. 168-4004-002	UG-88/U	81349	1
J910 THRU J913	CONNECTOR,JACK SINGER PART NO. 556016-248	46000	19048	1
J914	CONNECTOR,JACK SINGER PART NO. 556016-245	17650	02660	1
J915	CONNECTOR,JACK SINGER PART NO. 556010-165	UG-625B/U	81349	1
J916	SAME AS J900			
J918	CONNECTOR,JACK, 15 PIN	9576-001	16665	1
L900	COIL,TORROID	005314-001	16665	1
L901	COIL,FILTER	005313-001	16665	1
L902	TRANSFORMER,VARIABLE	005286-001	16665	1
L903	TRANSFORMER,VARIABLE	005279-001	16665	1
L904	TRANSFORMER,VARIABLE	005351-001	16665	1
L905 THRU L907	SAME AS L901			
L908	COIL,TORROID	005302-001	16665	1
L909 THRU L910	NON-REPLACEABLE PART OF FL-900			
L911	SAME AS L904			
L912	SAME AS L902			
L913	SAME AS L903			
L914 AND L915	NON-REPLACEABLE PART OF FL-900			
L916	TRANSFORMER,RF	103-1238-001	16665	1
L922	TRANSFORMER,VARIABLE	005287-001	16665	1
L923	TRANSFORMER,VARIABLE	005280-001	16665	1
L924	TRANSFORMER,VARIABLE	005352-001	16665	1
L940	TRANSFORMER,VARIABLE	103-1171-001	16665	1

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L941	TRANSFORMER,VAIRBALE	103-1172-001	16665	1
L942	TRANSFORMER,VARIABLE	005288-001	16665	1
L943	COIL,VARIABLE	021729-001	16665	1
P902	SAME AS J909			
P907	SAME AS J909			
P908	CONNECTOR,PLUG SINGER PART NO. 168-4038-001	6001	91737	1
P910 AND P913	CONNECTOR,PLUG SINGER PART NO. 168-4007-001	45050	19048	1
P915 AND P916	SAME AS P902			
R901 AND R902	RESISTOR,FIXED,PREC.,24.9OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-BIJR9F	C1/8E24R9OHMPORM1PCT	12126	1
R903 THRU R908	RESISTOR,FIXED,PREC., 71.5 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B71R5F	C1/8E71R5OHMPORM1PCT	12126	1
R909 THRU R918	RESISTOR,FIXED,PREC., 5.76 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B5R76F	C1/8E5R76OHMPORM1PCT	12126	1
R919	RESISTOR,FIXED,PREC., 95.3 OHMS,PORM 1 PCT 1/8W SINGER PART NO. 151-1006-B95R3F	C1/8E95R3OHMPORM1PCT	12126	1
R920 THRU R924	RESISTOR,FIXED,PREC.,48.7OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B48R7F	C1/8E48R7OHMPORM1PCT	12126	1
R925	RESISTOR,FIXED,PREC., 33.2 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B33R2F	C1/8E33R2OHMPORM1PCT	12126	1
R926	RESISTOR,FIXED,PREC., 866 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B8660F	C1/8E866OHMPORM1PCT	12126	1
R927 THRU R935	RESISTOR,FIXED,PREC., 432 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B4320F	C1/8E432OHMPORM1PCT	12126	1
R936	SAME AS R920			
R937	RESISTOR,FIXED,COMP, 1 MEGOHM PORM 5 PCT 1/2W SINGER PART NO. 151-1003-105J	EB105J	01121	2
R938	RESISTOR,FIXED,COMP. 2.2MEG,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-225J	EB2255	01121	1
R939	RESISTOR,FIXED,COMP, 2.2K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-222J	EB2225	01121	1
R940	RESISTOR,FIXED,COMP, 220K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-224J	EB2245	01121	1
R941	RESISTOR,FIXED,COMP, 10K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	2
R942	RESISTOR,FIXED,COMP, 470K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-474J	EB4745	01121	1
R943	RESISTOR,FIXED,COMP, 2.7K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-272J	EB2725	01121	1
R944	RESISTOR,FIXED,COMP, 47 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	1

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R945	RESISTOR,FIXED,COMP, 470 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-471J	EB4715	01121	1
R946 AND R947	RESISTOR,FIXED,PREC, 1.2K OHMS,PORM 1 PCT, 1/2W SINGER PART NO. 151-1008-B1201F	C1/2E1R2KOHMPORM1PCT	12126	1
R948	RESISTOR,FIXED,COMP., 330 OHMS,PORM 5 PCT, 1/4W SINGER PART NO. 151-1002-331J	CB3315	01121	1
R949	RESISTOR,FIXED,COMP, 150 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-151J	EB1515	01121	1
R950	RESISTOR,FIXED,COMP, 51 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-510J	EB5105	01121	1
R951 AND R952	RESISTOR,FIXED,COMP, 100K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-104J	EB1045	01121	1
R953	SAME AS R937			
R954	RESISTOR,FIXED,COMP, 390 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-391J	EB3915	01121	1
R955	RESISTOR,FIXED,COMP, 47K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-473J	EB4735	01121	2
R956	SAME AS R937			
R957	RESISTOR,FIXED,COMP, 1K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	1
R958	SAME AS R940			
R959	SAME AS R954			
R960	SAME AS R955			
R961	SAME AS R945			
R962	SAME AS R937			
R963	SAME AS R940			
R964	SAME AS R954			
R965	SAME AS R955			
R966	RESISTOR,FIXED,COMP, 470 OHMS,PORM 5 PCT 1W SINGER PART NO. 151-1004-471J	GB4715	01121	1
R967	SAME AS R940			
R968	RESISTOR,FIXED,COMP, 680 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-681J	EB6815	01121	1
R969	SAME AS R941			
R970	RESISTOR,FIXED,COMP, 560K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-564J	EB5645	01121	1
R971	RESISTOR,FIXED,COMP, 220 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-221J	EB2215	01121	1
R972	SAME AS R941			
R973	SAME AS R946			

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R974	SAME AS R939			
R975	RESISTOR,FIXED,WIRE-WOUND, 7.5 K OHMS,10W SINGER PART NO. 556034-250	FR-10-7R5K	14841	1
R976	RESISTOR,FIXED,COMP, 22K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-223J	EB2235	01121	1
R977	RESISTOR,FIXED,PREC., 82 OHMS,PORM 1 PCT, 1/8W SINGER PART NO. 151-1006-B82ROF	C1/8E82OHMSPORM1PCT	12126	1
R978	SAME AS R971			
R981	SAME AS R946			
R982	SAME AS R955			
R983	SAME AS R949			
R984	RESISTOR,FIXED,COMP., 150 OHMS,PORM 5 PCT, 1/4W SINGER PART NO. 151-1002-151J	CB1515	01121	1
R991	RESISTOR,VARIABLE, 5K OHMS SINGER PART NO. 556056-075	35005-2-502	80294	1
R992	RESISTOR,VARIABLE, 15K OHMS,PORM 10 PCT,2W	151-0007-083	16665	1
R993	RESISTOR,FIXED,COMP, 62K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1004-623J	GB6235	01121	1
R994	FACTORY SELECTED			
S900A THRU S900D	BAND SWITCH WAFER ASSY	005294-001	16665	1
S900E THRU S900N	BAND SWITCH WAFER ASSY	005199-001	16665	1
S900P AND S900Q	SAME AS S900E			
S901	SWITCH,TOGGLE SINGER PART NO. 556019-294	T2-104	81640	1
S902 AND S903	SWITCH,ROTARY	004961-001	16665	1
S904	SWITCH,TOGGLE,SPST SINGER PART NO. 556019-289	ST42-A	73559	1
S905	SAME AS S901			
T900 THRU T902	TRANSFORMER,VARIABLE	005194-001	16665	1
T903	TRANSFORMER,VARIABLE	005188-001	16665	1
V900	LAMP,NEON SINGER PART NO. 556002-030	NE-2	08806	2
V901	ELECTRON TUBE SINGER PART NO. 556027-199	6BA6	81349	1
V902	ELECTRON TUBE SINGER PART NO. 556027-097	6C4	81349	1
V903	ELECTRON TUBE SINGER PART NO. 556027-095	6CB6A	81349	1
V904 THRU V907	ELECTRON TUBE SINGER PART NO. 556027-	6BJ6	81349	4

TABLE 6-3. PARTS LIST, MODELS T-X/NF-105 AND T-X/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
V908	ELECTRON TUBE SINGER PART NO. 556027-193	2D21	81349	1
V909	SAME AS V902			
W901	CABLE ASSY	102-9200-240	16665	1
W902	CABLE ASSY	102-9200-220	16665	1
XDS900 THRU XDS902	SOCKET,LAMP SINGER PART NO. 556002-291	7-14	72619	1
XV901 THRU XV909	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	81349	1

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
A1	TUNER BAND 1, 0.15 TO 0.36 MEGAHERTZ	103-1194-001	16665	1
A2	TUNER BAND 2, 0.36 TO 0.87 MEGAHERTZ,	103-1192-001	16665	1
A3	TUNER BAND 3, 0.87 TO 2.1 MEGAHERTZ	103-1190-001	16665	1
A4	TUNER BAND 4, 2.1 TO 5.2 MEGAHERTZ,	103-1191-001	16665	1
A5	TUNER BAND 5, 5.2 TO 12.7 MEGAHERTZ,	103-1193-001	16665	1
A6	TUNER BAND 6, 12.7 TO 30 MEGAHERTZ,	103-1194-001	16665	1
C700	CAPACITOR,VARIABLE, 5 TO 25 PF SINGER PART NO. 556122-025	557-000-NPO-5-25	72982	3
C701	CAPACITOR,FIXED,CERAMIC, 15 PF,PORM 10 PCT, 500V SINGER PART NO. 556060-115	CC20CH150K	81349	2
C702	SAME AS C700			
C703	CAPACITOR,FIXED,CERAMIC, 15 PF,PORM 5 PCT 500V SINGER PART NO. 556060-114	CC20CH150J	81349	1
C704	SAME AS C700			
C705	SAME AS C701			
C706	SAME AS C700			
C707	SAME AS C701			
C708	SAME AS C700			
C709	SAME AS C701			
C710	SAME AS C700			
C711	SAME AS C701			
C712	CAPACITOR,VARIABLE, 10 TO 290 PF	556074-121	16665	1
C713	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,250V SINGER PART NO. 556060-146	DA140-172B	71590	5
C714	CAPACITOR,FIXED,DIPPED MICA, 1000 PF, PORM 5 PCT,100V SINGER PART NO. 150-2003-102FJ0	DM19F102J0100WV4CR	72136	1
C715 AND C716	SAME AS C713			
C717	CAPACITOR,FIXED,DIPPED MICA, 100 UF, PORM 5 PCT,500V SINGER PART NO. 150-2002-101EJ0	DM15E101J0500WV4CR	72136	1
C718	CAPACITOR,FIXED,DIPPED MICA, 200 PF, PORM 5 PCT,500V SINGER PART NO. 150-2002-201EJ0	DM15E201J0500WV4CR	72136	1
C719	CAPACITOR,FIXED,CERAMIC, 3 PF,PORM 0.25 PF, 500V SINGER PART NO. 556060-107	CC20CH030C	81349	1
C720 AND C721	CAPACITOR,FIXED,CERAMIC, 2 PF,PORM 0.25 PF, 500V SINGER PART NO. 556060-166	CC20CK020C	81349	1
C722	SAME AS C700			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C723	SAME AS C701			
C724	SAME AS C700			
C725	CAPACITOR,FIXED,CERAMIC, 5 PF, PORM 0.25 PCT 500V SINGER PART NO. 556060-109	CC20CH050C	81349	1
C726	SAME AS C700			
C727	SAME AS C725			
C728	SAME AS C700			
C729	SAME AS C701			
C730	SAME AS C700			
C731	SAME AS C701			
C732	SAME AS C700			
C733	SAME AS C701			
C734 THRU C737	SAME AS C713			
C738	SAME AS C700			
C739	CAPACITOR,FIXED,CERAMIC, 33 PF,PORM 5 PCT, 500V SINGER PART NO. 556060-119	CC25CH330J	81349	1
C740	SAME AS C700			
C741	CAPACITOR,FIXED,DIPPED MICA, 43 PF, PORM 2 PCT,500V SINGER PART NO. 150-2002-430EGO	DM15E430G0500WV4CR	72136	1
C742	SAME AS C700			
C743	SAME AS C701			
C744	SAME AS C700			
C745	SAME AS C701			
C748	SAME AS C713			
C749	CAPACITOR,FEED-THRU, 500 PF,PORM 20 PCT,500V SINGER PART NO. 556081-093	DA-785-014Q	71590	2
C750	SAME AS C700			
C751	SAME AS C701			
C752	SAME AS C700			
C753	SAME AS C725			
C754 AND C755	CAPACITOR,FIXED,CERAMIC, 25 PF,PORM 10 PCT, 500V SINGER PART NO. 556060-118	CC20CH250K	81349	1
C756	CAPACITOR,FIXED,DIPPED MICA, 118 PF, PORM 2 PCT,500V SINGER PART NO. 556125-040	DM19E1180G500WV4CR	72136	1
C757	CAPACITOR,FIXED,DIPPED MICA, 80 PF, PORM 2 PCT,500V SINGER PART NO. 150-2002-800EGO	DM15E800G0500WV4CR	72136	1

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C758	CAPACITOR,FIXED,DIPPED MICA, 540 PF, PORM 2 PCT,300V SINGER PART NO. 150-2002-541EGO	DM15E541G0300WV4CR	72136	1
C759	CAPACITOR,FIXED,DIPPED MICA, 390 PF, PORM 5 PCT,500V SINGER PART NO. 150-2002-391EJO	DM15E931J0500WV4CR	72136	1
C760	CAPACITOR,FIXED,DIPPED MICA, 960 PF, PORM 2 PCT,500V SINGER PART NO. 150-2003-961EGO	DM19E961G0500WV4CR	72136	1
C761	CAPACITOR,FIXED,DIPPED MICA, 2020 PF, PORM 2 PCT,100V SINGER PART NO. 556125-054	DM19E2021G0100WV4CR	72136	1
C762 AND C763	SAME AS C713			
C764	CAPACITOR,FIXED,PAPER, 0.47 UF,PORM 20 PCT, 200V SINGER PART NO. 556074-067	78P47402SI	56289	1
C765	CAPACITOR,FIXED,PAPER, 0.47 UF,PORM 20 PCT, 100V SINGER PART NO. 556074-066	78P47401SI	56289	1
C766	SAME AS C749			
C767	CAPACITOR,FIXED,CERAMIC DISC, 1000 PF,1000V SINGER PART NO. 556060-142	40C214	56289	1
C768	CAPACITOR,FIXED,DIPPED MICA, 250 PF, PORM 5 PCT,500V SINGER PART NO. 150-2002-251EJO	DM15E251J0500WV4CR	72136	1
C769	SAME AS C713			
C770	SAME AS C749			
C771	SAME AS C767			
C772 AND C773	SAME AS C713			
C774	SAME AS C749			
C775 AND C776	NON-REPLACEABLE PARTS OF Z701			
C777	SAME AS C767			
C778	SAME AS C713			
C779	SAME AS C767			
C780 AND C781	SAME AS C713			
C782	SAME AS C749			
C783 AND C784	NON-REPLACEABLE PARTS OF Z702			
C785 AND C786	SAME AS C767			
C787	SAME AS C713			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C788		SAME AS C749			
C789		SAME AS C713			
C790 C791	AND	NON-REPLACEABLE PARTS OF Z703			
C792 C793	AND	SAME AS C713			
C794		SAME AS C749			
C795		SAME AS C713			
C796		NON-REPLACEABLE PART OF Z704			
C797		SAME AS C749			
C798		CAPACITOR,FIXED,DIPPED MICA, 820 PF, PORM 5 PCT,300V SINGER PART NO. 150-2002-821EJO	DM15E821J0300WV4CR	72136	1
C799		SAME AS C767			
C800		SAME AS C713			
C801		SAME AS C749			
C802		SAME AS C767			
C803 C804	AND	SAME AS C713			
C805		SAME AS C749			
C806 C807	AND	NON-REPLACEABLE PARTS OF Z705			
C808		SAME AS C713			
C809 C810	AND	SAME AS C767			
C811 C812	AND	SAME AS C713			
C813		SAME AS C749			
C814 C815	AND	NON-REPLACEABLE PARTS OF Z706			
C816		SAME AS C767			
C817 C818	AND	SAME AS C713			
C819		SAME AS C749			
C820 C821	AND	SAME AS C713			
C822		NON-REPLACEABLE PART OF FL-701			
C823		SAME AS C767			
C824 C825	AND	SAME AS C713			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C826		SAME AS C749			
C827		SAME AS C713			
C828		NON-REPLACEABLE PART OF Z708			
C829		CAPACITOR,FIXED,CERAMIC, 0.01 UF,PORM 20 PCT 500V SINGER PART NO. 556060-012	5GAB-S10	56289	1
C830 C834	THRU	NON-REPLACEABLE PART OF FL-701			
C835 C837	THRU	SAME AS C713			
C838 C839	AND	NON-REPLACEABLE PART OF FL-701			
C840 C842	THRU	SAME AS C749			
C843		SAME AS C829			
C844		SAME AS C767			
C857		CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 150 PCT, MINUS 10 PCT,50V SINGER PART NO. 556074-168	NLW-25-50	14655	1
C871 C872	AND	NON-REPLACEABLE PARTS OF Z707			
DS700 DS701	AND	LAMP,PILOT SINGER PART NO. 556002-006	47	72619	5
FL-701		LOW PASS FILTER ASSY USED IN M-126 ONLY	103-0058-005	16665	1
FL-701		LOW PASS FILTER ASSY USED IN STD ONLY	103-0058-004	16665	1
J700		CONNECTOR,FILTER INPUT	009593-001	16665	1
J701		NON-REPLACEABLE PART OF FL-701			
J702 J708	THRU	CONNECTOR,JACK SINGER PART NO. 556016-248	46000	02660	1
J709		CONNECTOR,JACK SINGER PART NO. 168-4004-002	UG-88/U	81349	1
J712 J715	THRU	SAME AS J702			
L700		COIL,VARIABLE SINGER PART NO. 556002-325	ES1431	71450	1
L701		COIL,VARIABLE SINGER PART NO. 556002-377	ES1448	71450	1
L702		INDUCTOR,VARIABLE, 4.1 TO 11.3 UH SINGER PART NO. 556002-324	ES1431	71450	1
L705		COIL,RF	006443-001	16665	1
L706 L711	THRU	CHOKE, 7.9 UH SINGER PART NO. 556012-159	BP892	99800	1
L712 L717	THRU	NON-REPLACEABLE PARTS OF FL-701			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L718	CHOKE,RF SINGER PART NO. 556012-155	10203-21	82142	1
L719	SAME AS L706			
L720	SAME AS L718			
P701	CONNECTOR,PLUG SINGER PART NO. 168-4004-001	UG-88C/U	81349	1
P702 THRU P708	CONNECTOR,PLUG SINGER PART NO. 168-4007-001	45050	02660	1
P710	CONNECTOR,PLUG SINGER PART NO. 556016-245	17650	02660	1
P711	CONNECTOR,ASSY, 15 PIN	103-0013-002	16665	1
P712 THRU P715	SAME AS P702			
R701	NON-REPLACEABLE PART OF FL-701 USED IN STD ONLY			
R702	NON-REPLACEABLE PART OF FL-701 USED IN STD ONLY			
R700	RESISTOR,FIXED,COMP, 150 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-151J	EB1515	01121	2
R704	RESISTOR,FIXED,COMP, 10K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	1
R705	RESISTOR,FIXED,COMP, 1K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	2
R706 AND R707	RESISTOR,FIXED,COMP, 220 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-221J	EB2215	01121	1
R708	SAME AS R704			
R709	RESISTOR,FIXED,COMP, 220K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-224J	EB2245	01121	1
R710	RESISTOR,FIXED,COMP, 470 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-471J	151-1003-471J	01121	2
R711	RESISTOR,FIXED,COMP, 22K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-223J	EB2235	01121	2
R712	SAME AS R705			
R713 THRU R715	RESISTOR,FIXED,COMP, 1.5K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-152J	EB1525	01121	7
R716	RESISTOR,FIXED,COMP, 1.2K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-122J	EB1225	01121	1
R717	NON-REPLACEABLE PART OF FL-701			
R718	SAME AS R703			
R719	RESISTOR,FIXED,COMP, 4.7K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-472J	HB4725	01121	1
R720	SAME AS R703			
R721	RESISTOR,FIXED,COMP, 1 MEGOHM PORM 5 PCT 1/2W SINGER PART NO. 151-1003-105J	EB1055	01121	2

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R722	RESISTOR,FIXED,COMP, 100K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-104J	EB1045	01121	1
R723	SAME AS R705			
R724	RESISTOR,FIXED,COMP, 390 OHMS,PORM 5 &CT 1/2W SINGER PART NO. 151-1003-391J	EB3915	01121	1
R725	SAME AS R721			
R726	RESISTOR,FIXED,COMP, 47K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-473J	EB4735	01121	2
R727	SAME AS R705			
R728	SAME AS R724			
R729	SAME AS R726			
R730	SAME AS R721			
R731	RESISTOR,FIXED,COMP, 680K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-684J	EB6845	01121	1
RM32	SAME AS R710			
R733	SAME AS R724			
R734	SAME AS R726			
R735	RESISTOR,FIXED,COMP. 470 OHMS,PORM 5 PCT 1W SINGER PART NO. 151-1004-471J	GB4715	01121	2
R736	RESISTOR,FIXED,COMP, 680 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-681J	EB6815	01121	1
R737	RESISTOR,FIXED,COMP, 15K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-153J	EB1535	01121	1
R738	RESISTOR,FIXED,COMP, 150 OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-151J	HB1515	01121	1
R739	RESISTOR,FIXED,WIRE-WOUND, 7.5K OHMS, PORM 5 PCT, 10W SINGER PART NO. 556034-250	TYPE RW29	16119	1
R740	SAME AS R722			
R741	SAME AS R721			
R742	SAME AS R705			
R743	RESISTOR,FIXED,COMP. 100 OHMS PORM 5 PCT 1/2W SINGER PART NO. 151-1003-101J	EB1015	01121	1
R744	SAME AS R711			
R745	SAME AS R721			
R746 AND R747	NON-REPLACEABLE PART OF Z705			
R748	SAME AS R705			
R749	SAME AS R743			
R750	SAME AS R711			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R751	NON-REPLACEABLE PART OF Z706			
R752	SAME AS R710			
R753	NON-REPLACEABLE PART OF Z706			
R754	SAME AS R743			
R755	SAME AS R711			
R756 AND R757	NON-REPLACEABLE PART OF Z707			
R758	SAME AS R735			
R759	SAME AS R736			
R760	SAME AS R737			
R761	SAME AS R710			
R762	NON-REPLACEABLE PART OF Z708			
R763 AND R764	NON-REPLACEABLE PART OF Z701			
R765 AND R766	NON-REPLACEABLE PART OF Z702			
R767 AND R768	NON-REPLACEABLE PART OF Z703			
R769	RESISTOR,FIXED,COMP, 4.7K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-472J	EB4725	01121	1
R770	RESISTOR,FIXED,COMP, 47 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	1
R771	RESISTOR,VARIABLE, 5K OHMS,PORM 5 PCT SINGER PART NO. 556056-075	3500S-2-502	80294	1
R772	RESISTOR,VARIABLE, 15K OHMS,PORM 10 PCT,2W	151-0007-083	16665	1
R773	RESISTOR,FIXED,COMP, 62K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-623J	HB6235	01121	1
R774	SAME AS R726			
R775	RESISTOR,FIXED,COMP, 1 MEGOHM PORM 5 PCT 1/4W SINGER PART NO. 151-1002-105J	CB1055	01121	1
R776	RESISTOR,FIXED,COMP, 100 OHMS,PORM 5 PCT 1/4W SINGER PART NO. 151-1002-101J	CB1015	01121	1
R777	SAME AS R704			
R778	RESISTOR,FIXED,COMP, 150K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-154J	EB1545	01121	1
R779	RESISTOR,FIXED,COMP, 5.1K OHMS,PORM 5 PCT 1/4W SINGER PART NO. 151-1002-512J	CB5125	01121	1
R780	RESISTOR,FIXED,COMP. 330 OHMS,PORM 5 PCT 1/4W SINGER PART NO. 151-1002-331J	CB3315	01121	1
R781	SAME AS R703			

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R782 AND R783	SAME AS R726			
R784	SAME AS R713			
S701	SWITCH,MICRO	005375-001	16665	1
S702A AND S702B	SWITCH,ROTARY	006387-001	16665	1
T700	NON-REPLACEABLE PART OF Z701			
T701	NON-REPLACEABLE PART OF Z701			
T702	NON-REPLACEABLE PART OF Z703			
T703	NON-REPLACEABLE PART OF Z704			
T704	NON-REPLACEABLE PART OF Z705			
T705	NON-REPLACEABLE PART OF Z706			
T706	NON-REPLACEABLE PART OF Z707			
T707	NON-REPLACEABLE PART OF Z708			
T708	NON-REPLACEABLE PART OF A1			
T709	NON-REPLACEABLE PART OF A2			
T710	NON-REPLACEABLE PART OF A3			
T711	NON-REPLACEABLE PART OF A4			
T712	NON-REPLACEABLE PART OF A5			
T713	NON-REPLACEABLE PART OF A6			
T714	NON-REPLACEABLE PART OF A1			
T715	NON-REPLACEABLE PART OF A2			
T716	NON-REPLACEABLE PART OF A3			
T717	NON-REPLACEABLE PART OF A4			
T718	NON-REPLACEABLE PART OF A5			
T719	NON-REPLACEABLE PART OF A6			
T720	NON-REPLACEABLE PART OF A1			
T721	NON-REPLACEABLE PART OF A2			
T722	NON-REPLACEABLE PART OF A3			
T723	NON-REPLACEABLE PART OF A4			
T724	NON-REPLACEABLE PART OF A5			
T725	NON-REPLACEABLE PART OF A6			
V700	ELECTRON TUBE SINGER PART NO. 556027-210	5702	81349	2
V701	ELECTRON TUBE SINGER PART NO. 556027-211	5784	81349	1

TABLE 6-4. PARTS LIST, MODELS T-A/NF-105 AND T-A/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
V702	SAME AS V700			
V703 THRU V710	ELECTRON TUBE SINGER PART NO. 556027-200	6BJ6	81349	7
V711	ELECTRON TUBE SINGER PART NO. 556027-136	7586	81349	1
W701	CABLE ASSY	102-9200-241	16665	1
W702	CABLE ASSY	102-9200-242	16665	1
W703	CABLE ASSY	102-9200-240	16665	1
W704	SAME AS W701			
XDS700 AND XDS701	SOCKET,LAMP SINGER PART NO. 556002-290	7-05	72619	1
XV700 THRU XV702	SOCKET,TUBE SINGER PART NO. 556024-267	131-17-12-038	71785	1
XV703 THRU XV710	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	81349	1
XV711	SOCKET,TUBE SINGER PART NO. 556024-168	133-65-10-003	71785	1
Z701 THRU Z703	IF TRANSFORMER ASSY,1600KHZ	006078-001	16665	1
Z704	IF TRANSFORMER ASSY,1600KHZ	006076-001	16665	1
Z705 THRU Z707	IF TRANSFORMER ASSY,455KHZ	006077-001	16665	1
Z708	IF TRANSFORMER ASSY,455 KHZ	006075-001	16665	1

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
AT1	ATTENUATOR,FIXED,6DB USED IN STD ONLY	005372-001	16665	1
CR1	SEMICONDUCTOR, DEVICE,DIODE SINGER PART NO. 556118-187 USED IN M-126 ONLY	IN3005	81349	1
C57	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 5 PF, PORM 0.25 PF,500V SINGER PART NO. 556060-109	CC20CH050C	81349	1
C58 AND C59	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 33 PF, PORM 5 PCT,500V SINGER PART NO. 556060-119	CC25CH330J	81349	1
C60	CAPACITOR,VARIABLE, 3 TO 12 PF,NPO,500V SINGER PART NO. 556122-040	503-041-COPO-17R	72982	1
C61	CAPACITOR,FIXED,CERAMIC DISC., 0.001 UF,GMV, 1000V SINGER PART NO. 556060-142	40C214	56289	2
C62 AND C63	SAME AS C61			
C64	NON-REPLACEABLE PART OF Z2			
C65 AND C66	SAME AS C58			
C67	SAME AS C60			
C68	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 82 PF, PORM 5 PCT,500V SINGER PART NO. 556060-122	CC32CH820J	81349	1
C69 THRU C71	SAME AS C61			
C72	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,GMV, 500V SINGER PART NO. 150-1002-103PHF	871Z5S103PF GMV	72928	1
C73 AND C74	SAME AS C58			
C75	CAPACITOR,FIXED,MICA, 82 PF,PORM 5 PCT,500V SINGER PART NO. 556079-034	CM15E820J	72136	1
C76	CAPACITOR,CERAMIC,STANDOFF, 0.001 UF,GMV SINGER PART NO. 556074-124	TYPE SS5A	01121	2
C77	SAME AS C61			
C78	SAME AS C57			
C79	SAME AS C60			
C80	SAME AS C61			
C81	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 25 PF, PORM 10 PCT,500V SINGER PART NO. 556060-118	CC20CH250K	81349	1
C82	SAME AS C58			
C83	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 15 PF, PORM 10 PCT,500V SINGER PART NO. 556060-115	CC20CH150K	81349	1

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C84	SAME AS C60			
C85	SAME AS C72			
C86	CAPACITOR,CERAMIC,FEED-THRU, 1000 PF,GMV, 500V SINGER PART NO. 556005-381	FA5C-1000PFGMV500WV	01121	1
C87 THRU C89	SAME AS C61			
C90 AND C91	SAME AS C86			
C92 AND C93	CAPACITOR,RING, 4 X 1000 PF	556074-153	16665	1
C94	SAME AS C61			
C95	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 3 PF, PORM 0.25 PF,500V SINGER PART NO. 556060-107	CC20CH030C	81349	1
C96	CAPACITOR,VARIABLE, 1.5 TO 7 PF,NPO SINGER PART NO. 556074-113	TYPE TS-2A	72982	1
C97	SAME AS C76			
C98	CAPACITOR,FEED-THRU, 500 PF,PORM 20 PCT,500V SINGER PART NO. 556081-093	DA-785-0140	71590	2
C99	NON-REPLACEABLE PART OF Z4			
C100	CAPACITOR,FIXED,BUTTON, 1000 PF,PORM 5 PCT SINGER PART NO. 556099-015	TYPE M72	00853	1
C101	SAME AS C96			
C102	SAME AS C57			
C103	SAME AS C72			
C104	CAPACITOR, 1000 PF,GMV,500V SINGER PART NO. 556099-016 USED IN STD ONLY	SST-SI-1-1000MMF,GMV	00656	1
C105	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 2 PF, PORM 0.25 PF,500V SINGER PART NO. 556060-166	TYPE 301	72982	1
C106	SAME AS C72			
C107	NON-REPLACEABLE PART OF Z6 USED IN STD ONLY			
C107	SAME AS C98 USED IN M-126 ONLY			
C108	SAME AS C100			
C109	SAME AS C96			
C110	SAME AS C76			
C111	SAME AS C105			
C112	NON-REPLACEABLE PART OF Z6 USED IN STD ONLY			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C112	SAME AS C98 USED IN M-126 ONLY			
C113 AND C114	SAME AS C61			
C115	SAME AS C83			
C116	SAME AS C57			
C117	SAME AS C96			
C118	SAME AS C98			
C119	NON-REPLACEABLE PART OF Z6 USED IN M-126 ONLY			
C120 AND C121	SAME AS C104			
C122	NON-REPLACEABLE PART OF Z7 USED IN STD ONLY			
C122	NON-REPLACEABLE PART OF Z6 USED IN M-126 ONLY			
C123	SAME AS C104			
C124	SAME AS C98 USED IN STD ONLY			
C124	SAME AS C104 USED IN M-126 ONLY			
C125	SAME AS C76			
C126	NON-REPLACEABLE PART OF Z8 USED IN STD ONLY			
C126	NON-REPLACEABLE PART OF Z7 USED IN M-126 ONLY			
C127	SAME AS C104			
C128	SAME AS C98			
C129 AND C130	SAME AS C104			
C131	NON-REPLACEABLE PART OF Z5			
C132	NON-REPLACEABLE PART OF Z8 USED IN STD ONLY			
C132	CAPACITOR,CERAMIC DISC, 5000 PF,GMV,1000V SINGER PART NO. 556060-145 USED IN M-126 ONLY	TYPE B	06124	1
C133	SAME AS C104			
C134 THRU C136	SAME AS C76			
C137 AND C138	SAME AS C104			
C139	SAME AS C72			
C140 THRU C142	SAME AS C86			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C143 C144	AND	SAME AS C76			
C145		SAME AS C72			
C146 C147	AND	SAME AS C76			
C148		SAME AS C61/M-126/			
C149		CAPACITOR,CERAMIC DISC, 2000 PF,PORM 20 PCT SINGER PART NO. 556081-074	670-001-202M	72982	1
C150		SAME AS C104			
C151		NON-REPLACEABLE PART OF Z7 USED IN M-126 ONLY			
C152		SAME AS C98 USED IN M-126 ONLY			
C184		NON-REPLACEABLE PART OF Z7 USED IN STD ONLY			
C221		SAME AS C104			
C222		SAME AS C76 USED IN STD ONLY			
C222		SAME AS C98 USED IN M-126 ONLY			
C225		CAPACITOR,CERAMIC DISC. 0.01 UF,GMV,250V SINGER PART NO. 556060-146 USED IN STD ONLY	DA140-172B	71590	1
C226		SAME AS C98 USED IN STD ONLY			
C227		SAME AS C132 USED IN STD ONLY			
C228		CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 150 PCT, MINUS 10 PCT,50V SINGER PART NO. 556074-168	NLW-25-50	09023	1
C301 C305	THRU	NON-REPLACEABLE PARTS OF FL1-A			
C306 C310	THRU	NON-REPLACEABLE PARTS OF FL1-B			
C1001		CAPACITOR,FIXED,DIPPED MICA, 43 PF PORM 5 PCT,500V USED IN M-126 ONLY SINGER PART NO. 150-2002-430EJO	DM15E430J0500WV4CR	72136	1
C1002		SAME AS C61 USED IN M-126 ONLY			
C1003		SAME AS C81 USED IN M-126 ONLY			
C1004		SAME AS C61 USED IN M-126 ONLY			
C1005 C1006	AND	SAME AS C61 USE IN M-126 ONLY			
C1007 C1008	AND	SAME AS C98 USED IN M-126 ONLY			
DS1 DS2	AND	LAMP,PILOT SINGER PART NO. 556002-006	47	72619	5

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
FL1-A	LOW PASS FILTER ASSY	103-0054-001	16665	1
FL1-B	LOW PASS FILTER ASSY	103-0055-001	16665	1
FL-1001	FILTER,10.7 MC SINGER PART NO. 556006-143 USED IN M-126 ONLY	2104	03045	1
J1	NON-REPLACEABLE PART OF AT1 USED IN STD ONLY			
J1	CONNECTOR,PLUG USED IN M-126 ONLY SINGER PART NO. 556010-159	UG-291/U	81349	1
J2 THRU J4	CONNECTOR,JACK SINGER PART NO. 556016-248	46000	02660	1
J5 AND J6	CONNECTOR,JACK SINGER PART NO. 168-4018-002	UG-290A/U	81349	1
J7	CONNECTOR,JACK SINGER PART NO. 556024-276	123-211-1	74970	1
J8	CONNECTOR,JACK SINGER PART NO. 556010-261	51-043-0000	98291	1
J9	CONNECTOR,JACK SINGER PART NO. 168-4004-002	UG-88/U	81349	2
J10 AND J11	CONNECTOR,JACK SINGER PART NO. 556016-314 USED IN M-126 ONLY	1-310-1	95712	1
J301 AND J302	NON-REPLACEABLE PARTS OF FL1-A			
J303 AND J304	NON-REPLACEABLE PARTS OF FL1-B			
L19	NON-REPLACEABLE PART OF Z1			
L20	COIL,RF	001750-001	16665	1
L21	NON-REPLACEABLE PART OF Z1			
L22	SAME AS L20			
L23	NON-REPLACEABLE PART OF Z1			
L24	SAME AS L20			
L25	NON-REPLACEABLE PART OF Z1			
L26	COIL,RF	001751-001	16665	1
L27	COIL,RF,VARIABLE	004200-001	16665	1
L28	CHOKE, 1.0 UH SINGER PART NO. 556012-147	2150-04	99800	1
L30	SAME AS L28			
L32	NON-REPLACEABLE PART OF Z3			
L33	COIL,RF	001752-001	16665	1
L34	CHOKE, 1.0 UH SINGER PART NO. 556012-145	BP933	99800	1
L35	NON-REPLACEABLE PART OF Z3			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L36	COIL,RF	001753-001	16665	1
L37	SAME AS L34			
L38	NON-REPLACEABLE PART OF Z3			
L39	COIL,RF,STRIP	001754-001	16665	1
L40	COIL,RF,VARIABLE	004200-002	16665	1
L41	NON-REPLACEABLE PART OF Z3			
L42	COIL,RF	001755-001	16665	1
L43	SAME AS L28			
L45	SAME AS L28			
L46	NON-REPLACEABLE PART OF Z8 USED IN STD ONLY			
L46	NON-REPLACEABLE PART OF Z7 USED IN M-126 ONLY			
L47	COIL,RF,VARIABLE	001858-004	16665	1
L48 THRU L50	SAME AS L28			
L71	SAME AS L28 USED IN M-126 ONLY			
L301 THRU L306	NON-REPLACEABLE PARTS OF FL1-A			
L307 THRU L312	NON-REPLACEABLE PARTS OF FL1-B			
L1000 AND L1001	COIL,IF AMPLIFIER, 10.7 MC USED IN M-126 ONLY	001858-300	16665	1
P1	CONNECTOR,PLUG SINGER PART NO. 556016-245	17650	02660	1
P2 THRU P4	CONNECTOR,PLUG SINGER PART NO. 168-4007-001	45050	02660	1
P5	SAME AS J9			
P6	SAME AS J1/M-126/			
P7	PLUG,PHONE SINGER PART NO. 556146-567	202-15-01-026	71785	1
P8	CONNECTOR,PLUG SINGER PART NO. 168-4038-001	6001	91737	1
P9	CONNECTOR,ASSY	103-0013-001	16665	1
P10 AND P11	ADAPTER,CONNECTOR,COAX,UHF FEMALE TO N TYPE FEMALE SINGER PART NO. 556016-240 USED IN M126 ONLY	5276	91712	1
P301	SAME AS J9			
P302	SAME AS J9			
P303	SAME AS J9			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
P304	SAME AS J9			
R34	RESISTOR,FIXED,COMP.,27K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-273J	EB273J	01121	2
R35	RESISTOR,FIXED,COMP.,220 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-221J	EB2215	01121	2
R36	RESISTOR,FIXED,COMP.,2.7K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-272J	EB2725	01121	3
R37	SAME AS R34			
R38	RESISTOR,FIXED,ROD, 15.7 OHMS,PORM 1 PCT, 1/2W USED IN STD ONLY	556029-386	16665	1
R39	SAME AS R34			
R40	RESISTOR,FIXED,COMP.,100 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-101J	EB1015	01121	2
R41	SAME AS R36			
R42	SAME AS R40			
R43	SAME AS R34			
R44	RESISTOR,FIXED,COMP.,150 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-151J	EB1515	01121	3
R45	RESISTOR,FIXED,COMP.,47 OHMS,PORM 5 PCT,1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	1
R46	RESISTOR,FIXED,COMP.,1K OHMS,PORM 5 PCT,1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	1
R47	RESISTOR,FIXED,COMP.,10K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	1
R48	RESISTOR,FIXED,OCMP.,5.6K OHMS,PORM 5 PCT,2W SINGER PART NO. 151-1005-562J	HB5625	01121	1
R49	RESISTOR,FIXED,DSIC, 62 OHMS,PORM 1 PCT,1/2W USED IN STD ONLY	556029-367	16665	1
R50	RESISTOR,VARIABLE, 5K OHMS,PORM 10 PCT,2W USED IN STD ONLY	151-0007-065	16665	1
R51	RESISTOR,FIXED,COMP.,10 OHMS,PORM 5 PCT,1/2W SINGER PART NO. 151-1003-100J	EB1005	01121	1
R52	SAME AS R38 USED IN STD ONLY			
R52	RESISTOR,VARIABLE, 1K OHM SINGER PART NO. 151-0022-001 USED IN M-126 ONLY	TYPE L	01121	1
R53	RESISTOR,FIXED,COMP.,47K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-473J USED IN M-126 ONLY	EB4735	01121	2
R54	SAME AS R35			
R55	SAME AS R40 USED IN STD ONLY			
R56	RESISTOR,FIXED,COMP.,390 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-391J	EB3915	01121	1

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R57	SAME AS R40			
R58	SAME AS R34			
R59	SAME AS R35			
R60	RESISTOR,FIXED,COMP.,22K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-223J	EB2235	01121	1
R61	SAME AS R45 USED IN M-126 ONLY			
R61	SAME AS R51 USED IN STD ONLY			
R62	SAME AS R45			
R63	SAME AS R40			
R64	SAME AS R34			
R65	SAME AS R47			
R66	SAME AS R60			
R67	SAME AS R47			
R69	SAME AS R48			
R70	SAME AS R44			
R170	NON-REPLACEABLE PART OF Z6 USED IN STD ONLY			
R171	NON-REPLACEABLE PART OF Z7 USED IN STD ONLY			
R171	NON-REPLACEABLE PART OF Z6 USED IN M-126 ONLY			
R172	SAME AS R46			
R173	SAME AS R40			
R174	SAME AS R36			
R175	SAME AS R44			
R176	RESISTOR,FIXED,COMP.,330K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-334J	EB3345	01121	1
R177	SAME AS R53			
R178	SAME AS R40			
R179	SAME AS R36			
R180	SAME AS R176			
R181	SAME AS R44			
R182	SAME AS R40			
R183	SAME AS R36			
R184	NON-REPLACEABLE PART OF Z8 USED IN STD ONLY			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R184	NON-REPLACEABLE PART OF Z7 USED IN M-126 ONLY			
R185	RESISTOR,FIXED,COMP.,680 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-681J	EB6815	01121	1
R186 THRU R188	SAME AS R44			
R190	SAME AS R44 USED IN STD ONLY			
R199	SAME AS R44			
R240	RESISTOR,FIXED,COMP.,1 MEGOHM,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-105J	EB1055	01121	1
R241	SAME AS R35			
R242 AND R243	RESISTOR,FIXED,COMP.,100K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-104J	EB1045	01121	1
R244 AND R245	SAME AS R36			
R281	SAME AS R35			
R282	RESISTOR,VARIABLE, 5K OHMS SINGER PART NO. 556056-075	35005-2-502	80294	1
R283	RESISTOR,VARIABLE, 15K OHMS,PORM 10 PCT,2W	151-0007-083	16665	1
R284	RESISTOR,FIXED,COMP.,62K OHMS,PORM 5 PCT,2W SINGER PART NO. 151-1005-623J	HB6235	01121	1
R286	RESISTOR,FIXED,COMP.,75 OHMS,PORM 5 PCT,1/2W SINGER PART NO. 151-1003-750J	EB7505	01121	1
R287	RESISTOR,FIXED,COMP.,120 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-121J	EB1215	01121	1
R660	RESISTOR,FIXED,COMP.,2.2K OHMS,PORM 5 PCT,2W SINGER PART NO. 151-1005-222J USED IN M-126 ONLY	HB2225	01121	1
R663	SAME AS R45 USED IN M-126 ONLY			
R1000	RESISTOR,FIXED,COMP.,750 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-751J	EB7515	01121	1
R1001 AND R1002	SAME AS R176 USED IN M-126 ONLY			
R1003	SAME AS R40 USED IN M-126 ONLY			
R1004	SAME AS R36 USED IN M-126 ONLY			
S1	SWITCH,ROTARY,1 SECT,4 POLE,2 THROW	003450-001	16665	1
S2	SWITCH,SENSITIVE,SPDT	005375-001	16665	1
T1	TRANSFORMER,RF	002493-001	16665	1
T5	NON-REPLACEABLE PART OF Z2			
T6	NON-REPLACEABLE PART OF Z4			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
T7		NON-REPLACEABLE PART OF Z5			
T8		NON-REPLACEABLE PART OF Z6 USED IN STD ONLY			
T8		TRANSFORMER,RF			
T9		NON-REPLACEABLE PART OF Z7 USED IN STD ONLY			
T9		NON-REPLACEABLE PART OF Z6 USED IN M-126 ONLY			
V8 V9	AND	ELECTRON TUBE SINGER PART NO. 556027-069	6AK5	81349	4
V10		ELECTRON TUBE SINGER PART NO. 556027-018	12AT7-JAN	81349	1
V11 V12	AND	SAME AS V8			
V13		ELECTRON TUBE SINGER PART NO. 556027-118	6U8/A	81349	1
V14		SAME AS V8			
V15 V17	THRU	ELECTRON,TUBE SINGER PART NO. 556027-200	6BJ6	81349	3
V40		SAME AS V8 USED IN M-126 ONLY			
W1		CABLE ASSY	102-9200-032	16665	1
W2		CABLE ASSY	102-9200-031	16665	1
W3		CABLE ASSY	102-9200-200	16665	1
W4		CABLE ASSY	102-9200-201	16665	1
XDS1 XDS2	AND	SOCKET,LAMP SINGER PART NO. 556002-290	7-05	72619	1
XV8 XV9	AND	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	91662	1
XV10		SOCKET,TUBE SINGER PART NO. 556024-269	TS103C01	81349	1
XV11 XV12	AND	SAME AS XV8			
XV13		SAME AS XV10			
XV14 XV17	THRU	SAME AS XV8			
XV40		SAME AS XV8 USED IN M-126 ONLY			
Z1		INDUCTUNER	001914-002	16665	1
Z2		TRANSFORMER,IF	001858-001	16665	1
Z3		INDUCTUNER	001914001	16665	1
Z4		SAME AS Z2			
Z5		SAME AS Z2			

TABLE 6-5. PARTS LIST, MODELS T-1/NF-105 AND T-1/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
Z6 AND Z7	SAME AS Z6/M-126/ USED IN STD ONLY			
Z6	TRANSFORMER,IF USED IN M-126 ONLY	001858-002	16665	1
Z7	TRANSFORMER,IF USED IN M-126 ONLY	001858-003	16665	1
Z8	SAME AS Z7/M-126/ USED IN STD ONLY			

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
CR1	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-088	IN21C	81349	1
CR2	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-187 USED IN M-126 ONLY	IN3005	81349	1
C2	CAPACITOR,VARIABLE, 1.5 TO 7 PF,NPO SINGER PART NO. 556074-113	TYPE TS-ZA	72982	1
C3	CAPACITOR,VARIABLE,3.3 PF	002145-001	16665	1
C4	CAPACITOR,COMP.,0.47 PF,PORM 10 PCT,500V SINGER PART NO. 150-4001-R47K	TYPE GA	78488	1
C5	CAPACITOR,VARIABLE, 3 TO 30 PF SINGER PART NO. 556074-119	TYPE VU-30	80583	1
C6	CAPACITOR,CERAMIC DISC, 0.01 UF,GMV,250V SINGER PART NO. 556060-146	DA140-172B	71590	1
C7	CAPACITOR,BUTTON, 185 PF SINGER PART NO. 556125-071	7935	72982	1
C8	CAPACITOR,VARIABLE, 3 TO 12 PF,NPO,500V SINGER PART NO. 556122-040	503-041-COPO-17R	72982	1
C9 AND C10	CAPACITOR,FIXED,MICA, 100 PF,PORM 5 PCT 500V SINGER PART NO. 556078-012	CM15C101J	72136	1
C11	CAPACITOR,VARIABLE,3-30PF	002145-003	16665	1
C12	SAME AS C8			
C13	CAPACITOR,CERAMIC,STANDOFF, 0.001 UF,GMV SINGER PART NO. 556074-124	TYPE SS5A	01121	1
C14 AND C15	CAPACITOR,CERAMIC,FEED-THRU,'1000 PF,GMV, 500V SINGER PART NO. 556005-381	TYPE FA5C	01121	2
C16	CAPACITOR,FIXED,BUTTON, 1000 PF,PORM 5' PCT SINGER PART NO. 556099-015	TYPE M72	00853	1
C17 AND C18	SAME AS C14			
C19	NON-REPLACEABLE PART OF Z4 USED IN STD ONLY			
C19	NON-REPLACEABLE PART OF Z2 USED IN M-126 ONLY			
C20	SAME AS C2			
C21	SAME AS C14			
C22	SAME AS C6			
C23	SAME AS C14 USED IN M-126 ONLY			
C24	CAPACITOR, 1000 PF,GMV,500V SINGER PART NO. 556099-016 USED IN STD ONLY	SST-SI-1-1000MMF,GMV	00656	1
C25	CAPACITOR,CERAMIC DISC, 5000 PF,GMV,1000V SINGER PART NO. 556060-145 USED IN STD ONLY	TYPE B	06124	1

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C26	SAME AS C24 USED IN STD ONLY			
C28	SAME AS C13 USED IN STD ONLY			
C29	CAPACITOR,FEED-THRU, 500 PF,PORM 20 PCT,500V SINGER PART NO. 556081-093	DA-785-0140	71590	1
C31	SAME AS C24			
C32 AND C33	SAME AS C24 USED IN STD ONLY			
C34 AND C35	SAME AS C13 USED IN STD ONLY			
C38	SAME AS C25			
C39	SAME AS C24			
C40 AND C41	SAME AS C13			
C43	NON-REPLACEABLE PART OF Z5 USED IN STD ONLY			
C43	NON-REPLACEABLE PART OF Z3 USED IN M-126 ONLY			
C44	SAME AS C25			
C45	SAME AS C24			
C46 AND C47	SAME AS C13			
C48	SAME AS C24			
C49	CAPACITOR,CERAMIC DISC, 2000 PF,PORM 20 PCT SINGER PART NO. 556081-074	670-001-202M	72982	1
C50	SAME AS C13			
C51	SAME AS C24 USED IN STD ONLY			
C52	SAME AS C13 USED IN STD ONLY			
C53 THRU C55	SAME AS C13			
C60	CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 150 PCT, MINUS 10 PCT,50V SINGER PART NO. 556074-168	NLW-25-50	09023	1
C61	NON-REPLACEABLE PART OF Z1 USED IN STD ONLY			
C62 AND C63	NON-REPLACEABLE PART OF Z2 USED IN STD ONLY			
C64 AND C65	NON-REPLACEABLE PART OF Z3 USED IN STD ONLY			
C66	NON-REPLACEABLE PART OF Z4 USED IN STD ONLY			
C66	NON-REPLACEABLE PART OF Z2 USED IN M-126 ONLY			

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C67	NON-REPLACEABLE PART OF Z5 USED IN STD ONLY			
C67	NON-REPLACEABLE PART OF Z3 USED IN M-126 ONLY			
C201 THRU C205	NON-REPLACEABLE PART OF FL2			
C218	SAME AS C14			
C228	SAME AS C24			
C229	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 5 PF, PORM 3.25 PF,500V SINGER PART NO. 556060-109	CC20CH050C	81349	1
C230 AND C232	SAME AS C29			
C235	SAME AS C25			
C900	CAPACITOR,FIXED,CERAMIC DIELECTRIC, 10 PF, PORM 10 PCT,500V SINGER PART NO. 556060-112 USED IN M126 ONLY	CC20CH100K	81349	1
C901	SAME AS C13 USED IN M-126 ONLY			
C902	SAME AS C24 USED IN M-126 ONLY			
C903 AND C904	SAME AS C13 USED IN M-126 ONLY			
C905	SAME AS C900 USED IN M-126 ONLY			
C906 THRU C908	SAME AS C13 USED IN M-126 ONLY			
C910	SAME AS C13 USED IN M-126 ONLY			
C911	SAME AS C900 USED IN M-126 ONLY			
C912 THRU C915	SAME AS C13 USED IN M-126 ONLY			
C916	SAME AS C900 USED IN M-126 ONLY			
C909	CAPACITOR,CERAMIC DISC,0.001 UF,GMV,1000V SINGER PART NO. 556060-142 USED IN M-126 ONLY	40C214	56289	1
C917	SAME AS C909 USE IN M-126 ONLY			
C918	SAME AS C29 USED IN M-126 ONLY			
C919	SAME AS C909 USED IN M-126 ONLY			
C920	NON-REPLACEABLE PART OF Z1 USED IN M-126 ONLY			
C921	SAME AS C909 USED IN M-126 ONLY			
C922	SAME AS C29 USED IN M-126 ONLY			
C923	SAME AS C909 USED IN M-126 ONLY			

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C924	SAME AS C29 USED IN M-126 ONLY			
C925	SAME AS C909 USED IN M-126 ONLY			
C927	SAME AS C6 USED IN M-126 ONLY			
C929	SAME AS C6 USED IN M-126 ONLY			
DS1	LAMP,PILOT SINGER PART NO. 556002-006	47	72619	5
FL2	FILTER ASSY,LOW PASS 400 MHZ USED IN STD ONLY	103-0058-002	16665	1
FL2	FILTER ASSY,LOW PASS,400 MHZ USED IN M-126 ONLY	103-0058-003	16665	1
FL-901	FILTER,30.0 MC SINGER PART NO. 556006-145 USED IN M-126 ONLY	2135	03045	1
J201	CONNECTOR,JACK SINGER PART NO. 168-4007-001	UG-291/U	81349	1
J202 AND J203	NON-REPLACEABLE PART OF FL2			
J204	CONNECTOR,JACK SINGER PART NO. 556010-164	UG-625/U	81349	1
J205	CONNECTOR,JACK SINGER PART NO. 168-4018-002	UG-290A/U	81349	1
J206	CONNECTOR,PLUG SINGER PART NO. 556016-248	46000	19048	1
J207	CONNECTOR,JACK SINGER PART NO. 556016-314 USED IN M-126 ONLY	1-310-1	95712	1
J208	CONNECTOR,JACK SINGER PART NO. 168-8009-001 USED IN STD ONLY	366-8	95712	1
J208	SAME AS J207 USED IN M-126 ONLY			
J210	SAME AS J208 USED IN M-126 ONLY			
L1	COIL,RF	002016-001	16665	1
L2	COIL,RF	002116-002	16665	1
L3	COIL,RF	002116-003	16665	1
L4	COIL,RF	002115-001	16665	1
L5	COIL,RF	002199-001	16665	1
L6	TRANSFORMER,RF	004159-001	16665	1
L7	CHOKE, 1.0 UH SINGER PART NO. 556012-147	2150-04	99800	2
L8	COIL,RF	004201-001	16665	1
L9	CHOKE, 1.0 UH SINGER PART NO. 556012-145	BP933	99800	1
L10	SAME AS L7			
L11	NON-REPLACEABLE PART OF Z5 /STD/			
L11	NON-REPLACEABLE PART OF Z3 /M-126/			

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L12 L13	AND	SAME AS L7 USED IN STD ONLY			
L14 L15	AND	SAME AS L7			
L16		COIL,RF,VARIABLE	001859-004	16665	1
L17 L18	AND	SAME AS L7			
L60		COIL,RF	005023-001	16665	1
L61		SAME AS L9			
L62		NON-REPLACEABLE PART OF Z4 /STD/			
L62		NON-REPLACEABLE PART OF Z2 /M-126/			
L67		SAME AS L7			
L201 L206	THRU	NON-REPLACEABLE PART OF FL2			
901		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-001	16665	1
L902		COIL,VARIABLE USED IN M-126 ONLY	114-0047-002	16665	1
L903		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-003	16665	1
L904		CHOKE,RF USED IN M-126 ONLY	009431-001	16665	1
L905		SAME AS L7 USED IN M-126 ONLY			
L906		SAME AS L7 USED IN M-126 ONLY			
L907		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-004	16665	1
L908		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-005	16665	1
P202 P204	THRU	CONNECTOR,PLUG SINGER PART NO.168-4004-002	UG-88/U	81349	1
P205		SAME AS P202			
P206		CONNECTOR,PLUG SINGER PART NO. 556016-247	45050	19048	1
P207		CONNECTOR,PLUG SINGER PART NO. 556016-245 USED IN STD ONLY	17650	02660	1
P207 P208	AND	CONNECTOR,PLUG SINGER PART NO. 556016-240 USED IN M-126 ONLY	5276-1	95712	1
P209		CONNECTOR,ASSY USED IN STD ONLY	103-0013-002	16665	1
P209		SAME AS P207 USED IN M-126 ONLY			
P211		SAME AS P209 USED IN M-126 ONLY			
R1		RESISTOR,FIXED,COMP.,150 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-151J USED IN STD ONLY	EB1515	01121	1
R4		RESISTOR,FIXED,COMP.,47 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	1

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R6	RESISTOR,FIXED,COMP.,470 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-471J	EB4715	01121	1
R7	NON-REPLACEABLE PART OF Z4 /STD/			
R7	NON-REPLACEABLE PART OF Z2 /M-126/			
R8	SAME AS R4			
R9	RESISTOR,FIXED,COMP.,100 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-101J	EB1015	01121	1
R10	SAME AS R4			
R11	RESISTOR,FIXED,WIRE-WOUND,20K OHMS,10W SINGER PART NO. 556035-164	FR-10	63743	1
R12	RESISTOR,FIXED,COMP.,10K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	1
R13	SAME AS R1 USED IN STD ONLY			
R14	RESISTOR,FIXED,COMP.,2.7K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-272J USED IN STD ONLY	EB2725	01121	1
R15	RESISTOR,FIXED,COMP., 330K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-334J USED IN STD ONLY	EB3345	01121	2
R16	RESISTOR,FIXED,COMP.,100 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-101J USED IN STD ONLY	EB1015	01121	1
R19	RESISTOR,FIXED,COMP.,47K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-473J USED IN STD ONLY	EB4735	01121	1
R20	SAME AS R15			
R21	RESISTOR,FIXED,COMP.,220 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-221J	EB2215	01121	1
R22	SAME AS R1 USED IN STD ONLY			
R23	SAME AS R14			
R24	SAME AS R1			
R25	SAME AS R21			
R26	SAME AS R1			
R27	RESISTOR,FIXED,COMP.,270 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-271J	EB2715	01121	1
R28	NON-REPLACEABLE PART OF Z5 /STD/			
R28	NON-REPLACEABLE PART OF Z3 /M-126/			
R29	RESISTOR,FIXED,COMP. 680 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-681J	EB6815	01121	1
R31	SAME AS R1			
R40	RESISTOR,VARIABLE, 5K OHMS SINGER PART NO. 556056-075	35005-2-502	80294	1

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R41	RESISTOR,VARIABLE, 15K OHMS,PORM 10 PCT,2W	151-0007-083	16665	1
R42	RESISTOR,FIXED,COMP. 62KOHMS,PORM 5 PCT, 2W SINGER PART NO. 151-1005-623J	HB6235	01121	1
R171	SAME AS R1			
R201 THRU R203	NON-REPLACEABLE PARTS OF FL2 /STD/			
R204	SAME AS R1			
R255	RESISTOR,FIXED,COMP. 10 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-100J USED IN STD ONLY	EB1005	01121	1
R256	SAME AS R19			
R267	SAME AS R19			
R268	RESISTOR,FIXED,COMP. 100K OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-104J	EB1045	01121	1
R269	RESISTOR,FIXED,COMP. 2.7K OHMS,PORM 5 PCT, 1W SINGER PART NO. 151-1004-272J USED IN STD ONLY	GB2725	01121	1
R270	SAME AS R4			
R272	RESISTOR,FIXED,COMP, 75 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-750J	EB7505	01121	1
R274	RESISTOR,FIXED,COMP, 120 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-121J	EB1215	01121	1
R282	RESISTOR,VARIABLE,500 OHM SINGER PART NO. 151-0022-001 USED IN M-126 ONLY	TYPE L	01121	1
R661	RESISTOR,FIXED,COMP. 2.2K OHMS,PORM 5 PCT, 2W SINGER PART NO. 151-1005-222J USED IN M-126 ONLY	HB2225	01121	1
R900 AND R901	SAME AS R9 USED IN M-126 ONLY			
R902	RESISTOR,FIXED,COMP. 4.7K OHMS,PORM 5 PCT, 1W SINGER PART NO. 151-1004-472J USED IN M126 ONLY	GB4725	01121	1
R903	SAME AS R255 USED IN M-126 ONLY			
R904	SAME AS R14 USED IN M-126 ONLY			
R905	SAME AS R1 USED IN M-126 ONLY			
R906	SAME AS R15 USED IN M-126 ONLY			
R907	SAME AS R21 USED IN M-126 ONLY			
R908	SAME AS R269 USED IN M-126 ONLY			
R909	RESISTOR,FIXED,COMP. 750 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-751J USED IN M-126 ONLY	EB7515	01121	1

TABLE 6-6. PARTS LIST, MODELS T-2/NF-105 AND T-2/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R911	SAME AS R15 USED IN M-126 ONLY			
R913	SAME AS R15 USED IN M-126 ONLY			
R914	SAME AS R21 USED IN M-126 ONLY			
R915	SAME AS R14 USED IN M-126 ONLY			
T1	NON-REPLACEABLE PART OF Z1 /STD/			
T2	NON-REPLACEABLE PART OF Z2 /STD/			
T3	NON-REPLACEABLE PART OF Z3 /STD/			
T900	NON-REPLACEABLE PART OF Z1 /M-126/			
V1	ELECTRON TUBE SINGER PART NO. 556027-214	5876	81349	1
V2	ELECTRON TUBE SINGER PART NO. 556027-201	6F4	81349	1
V3	ELECTRON TUBE SINGER PART NO. 556027-200 USED IN STD ONLY	6BJ6	81349	1
V3	ELECTRON,TUBE SINGER PART NO. 556027-092 USED IN M-126 ONLY	6BQ7	81349	1
V4 THRU V7	SAME AS V3 /STD/			
V900	ELECTRON TUBE SINGER PART NO. 556027-069 USED IN M-126 ONLY	6AK5	81349	1
W201	CABLE ASSY	102-9200-202	16665	1
XDS1	SOCKET,LAMP SINGER PART NO. 556002-290	7-05	72619	1
XV3 THRU XV7	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	91662	1
Z1	IF TRANSFORMER ASSY,30 MHZ USED IN STD ONLY	001859-001	16665	1
Z1	IF CRYSTAL FILTER COIL ASSY USED IN M-126 ONLY	103-0631-002	16665	1
Z2 AND Z3	IF TRANSFORMER ASSY,30 MHZ USED IN M-126 ONLY	001859-003	16665	1
Z2 AND Z3	IF TRANSFORMER ASSY,30 MHZ USED IN STD ONLY	001859-002	16665	1
Z4 AND Z5	SAME AS Z2 /M-126/			

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
CR3		SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-187 USED IN M-126 ONLY	IN3005	81349	1
CR601 CR602	AND	SEMICONDUCTOR DEVICE,DIODE SINGER PART NO. 556118-088	IN21C	81349	1
C601 C602	AND	CAPACITOR,FIXED,CERAMIC, 2 PF,PORM 0.25 PF, 500V SINGER PART NO. 556060-166	CC20CK020C	81349	1
C603 C604	AND	CAPACITOR,FEED-THRU, 500 PF SINGER PART NO. 556081-093	DA-785-014Q	71590	2
C605		CAPACITOR,VARIABLE	004426-001	16665	1
C606		CAPACITOR,FIXED,CERAMIC, 20 PF,PORM 5 PCT, 500 V SINGER PART NO. 556060-116	CC20CH200J	81349	1
C607 C608	AND	SAME AS C603			
C609		CAPACITOR,FIXED,COMP., 1 PF,PORM 10 PCT SINGER PART NO. 150-4001-1ROK	TYPE GA	78488	1
C610		CAPACITOR,CERAMIC,FEED-THRU, 1000 PF,GMV, 500V SINGER PART NO. 556005-381	FA5C	01121	3
C611		SAME AS C603			
C612 C613	AND	SAME AS C601			
C614 C616	THRU	SAME AS C610			
C617		CAPACITOR,CERAMIC STANDOFF, 1000 PF,GMV SINGER PART NO. 556074-124	SS5A WITH M6447	01121	1
C618		SAME AS C606			
C619		SAME AS C609			
C620 C621	AND	SAME AS C610			
C622		CAPACITOR,FIXED,CERAMIC, 5 PF,PORM 0.25 PF, 500V SINGER PART NO. 556060-109 USED IN STD ONLY	CC20CH050C	81349	1
C623 C626	THRU	CAPACITOR,FIXED,CERAMIC DICS, 1000 PF,GMV, 1000V SINGER PART NO. 556060-142 USED IN STD ONLY	40C214	56289	1
C627		CAPACITOR,FIXED,CERAMIC, 25 PF,PORM 10 PCT, 500V SINGER PART NO. 556060-118 USED IN STD ONLY	CC20CH250K	81349	1
C628 C630	THRU	NON-REPLACEABLE PART OF 700-1000 MHZ TUNER			
C631 C633	THRU	NON-REPLACEABLE PART OF 400-700 MHZ TUNER			
C634		SAME AS C610			
C635		SAME AS C623 USED IN STD ONLY			

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C636	SAME AS C617 USED IN STD ONLY			
C637	SAME AS C610 USED IN STD ONLY			
C638	CAPACITOR,FIXED,CERAMIC, 3 PF,PORM 0.25 PF, 500V SINGER PART NO. 556060-108 USED IN STD ONLY	CC20CH030C	81349	1
C639	SAME AS C617			
C640 THRU C642	SAME AS C610			
C643	SAME AS C617			
C644	SAME AS C610			
C645 AND C646	CAPACITOR,FIXED,RING,4 X 1000 PF SINGER PART NO. 556074-153	9KAD-8760	00656	1
C647	SAME AS C617 USED IN STD ONLY			
C648 AND C649	SAME AS C645 USED IN STD ONLY			
C647 AND C648	SAME AS C645 USED IN M-126 ONLY			
C650	SAME AS C623 USED IN STD ONLY			
C651	SAME AS C627 USED IN STD ONLY			
C656	SAME AS C627			
C657	SAME AS C623			
C659	SAME AS C610			
C661	SAME AS C623			
C662	SAME AS C627			
C665	SAME AS C617			
C668	SAME AS C623			
C669	CAPACITOR,FIXED,CERAMIC, 15 PF,PORM 10 PCT, 500V SINGER PART NO. 556060-115	CC20CH150K	81349	1
C670	SAME AS C617			
C672	SAME AS C610			
C673	SAME AS C623			
C674	SAME AS C617			
C675 AND C676	SAME AS C610 USED IN STD ONLY			
C677	SAME AS C617 USED IN STD ONLY			
C678	SAME AS C617			
C679	SAME AS C617 USED IN STD ONLY			

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C681		SAME AS C610 USED IN STD ONLY			
C684		SAME AS C610			
C686		SAME AS C610			
C687		SAME AS C623			
C688 C689	AND	CAPACITOR,FIXED,CERAMIC DISC, 0.01 UF,600V SINGER PART NO. 150-1002-103PHF	DA-048-248K	71590	1
C690		SAME AS C610			
C696		CAPACITOR,BUTTON, 2000 PF,PORM 20 PCT SINGER PART NO. 556081-074	670-001-202M	72982	1
C699		SAME AS C605			
C702		CAPACITOR,ELECTROLYTIC, 25 UF,PLUS 150 PCT, MINUS 10 PCT,50V SINGER PART NO. 556074-168	NLW-25-50	09023	1
C901 C902	AND	SAME AS C610 USED IN M-126 ONLY			
C903		SAME AS C617 USED IN M-126 ONLY			
C904		SAME AS C617 USED IN M-126 ONLY			
C924		SAME AS C622 USED IN M-126 ONLY			
C925 C927	THRU	SAME AS C623 USED IN M-126 ONLY			
C928		SAME AS C627 USED IN M-126 ONLY			
C929		SAME AS C617 USED IN M-126 ONLY			
C930		SAME AS C610 USED IN M-126 ONLY			
C931		SAME AS C623 USED IN M-126 ONLY			
C933		SAME AS C610 USED IN M-126 ONLY			
C934		SAME AS C617 USED IN M-126 ONLY			
C936		SAME AS C610 USED IN M-126 ONLY			
C937		SAME AS C617 USED IN M-126 ONLY			
C939		SAME AS C610 USED IN M-126 ONLY			
C940		SAME AS C623 USED IN M-126 ONLY			
C941		CAPACITOR,FIXED,CERAMIC, 22 PF,PORM 5 PCT, 500V SINGER PART NO. 556060-117 USED IN M-126 ONLY	CC20CH220J	81349	1
C942 C943	AND	SAME AS C623 USED IN M-126 ONLY			
C944		SAME AS C610 USED IN M-126 ONLY			
C945		SAME AS C623 USED IN M-126 ONLY			

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
C946 C947	AND	SAME AS C617 USED IN M-126 ONLY			
C948		SAME AS C623 USED IN M-126 ONLY			
DS601 DS602	AND	LAMP,PILOT, SINGER PART NO. 556002-006	47	72619	5
FL601		LOW PASS FILTER ASSY USED IN STD ONLY	004886-001	16665	1
FL901		FILTER,42 MC SINGER PART NO. 556006-144 USED IN M-126 ONLY	2136	03045	1
J601		CONNECTOR,JACK SINGER PART NO. 556010-159	UG-291/U	81349	1
J602 J603	AND	CONNECTOR,JACK SINGER PART NO. 556010-229 USED IN STD ONLY	UG-89/U	81349	1
J602 J603	AND	CONNECTOR,JACK SINGER PART NO. 556016-240 USED IN M-126 ONLY	5276-1	95712	1
J604 J605	AND	CONNECTOR,JACK SINGER PART NO. 556016-248	46000	19048	1
J606		CONNECTOR,JACK SINGER PART NO. 556010-163	UG-625/U	81349	1
J607		SAME AS J604			
J608		SAME AS J606			
J609 J610	AND	CONNECTOR,JACK SINGER PART NO. 556016-314	1-310-1	95712	1
J611		CONNECTOR,JACK SINGER PART NO. 556010-261	51-043-0000	98291	1
J613		CONNECTOR,PLUG SINGER PART NO. 168-4004-002	UG-88/U	81349	1
L601		CHOKE,RF	009425-001	16665	1
L602		CHOKE,RF	009426-001	16665	1
L603		CHOKE,RF	009427-001	16665	1
L604 L605	AND	CHOKE,RF	009428-001	16665	1
L606		SAME AS L603			
L608		SAME AS L606			
L609		CHOKE,RF	004618-001	16665	1
L610		CHOKE,RF	009430-001	16665	1
L611		CHOKE,RF	009429-001	16665	1
L612 L613	AND	SAME AS L604			
L614		SAME AS L611			
L615		SAME AS L603			
L617		SAME AS L603			
L618		COIL,VARIABLE 42 MHZ	006956-001	16665	1

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol		Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
L619		COIL,VARIABLE 42 MHZ	006954-001	16665	1
L620		CHOKE,RF 5.6 UH SINGER PART NO. 556012-155 USED IN STD ONLY	2150-18	99800	1
L621		SAME AS L615 USED IN STD ONLY			
L622		CHOKE,RF,BIFILAR-WOUND	009431-001	16665	1
L623 L624	AND	COIL,VARIABLE 42 MHZ USED IN STD ONLY	006953-001	16665	1
L625		SAME AS L623			
L626		COIL,VARIABLE 42 MHZ	006955-001	16665	1
L627		COIL,VARIABLE 42 MHZ	006967-001	16665	1
L628		COIL,VARIABLE	004419-001	16665	1
L630		CHOKE,RF, 3.3 UH SINGER PART NO. 556012-154	1840-18	99800	1
L631		NON-REPLACEABLE PART OF 700-1000 MHZ TUNER			
L632 L638	THRU	SAME AS L630			
L639		NON-REPLACEABLE PART OF 400-700 MHZ TUNER			
L640		COIL,VARIABLE 42 MHZ	006959-001	16665	1
L641		NON-REPLACEABLE PART OF 700-1000 MHZ TUNER			
L643		CHOKE,RF, 7.9 UH SINGER PART NO. 556012-159	BP892	99800	1
L644 L647	THRU	NON-REPLACEABLE PARTS OF 700-1000 MHZ TUNER			
L648 L653	THRU	NON-REPLACEABLE PARTS OF 400-700 MHZ TUNER			
L654 L655	AND	NON-REPLACEABLE PARTS OF 700-1000 MHZ TUNER			
L910		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-006	16665	1
L911		SAME AS L623 USED IN M-126 ONLY			
L912		INDUCTOR,VARIABLE USED IN M-126 ONLY	114-0047-009	16665	1
L913 L914	AND	COIL,VARIABLE USED IN M-126 ONLY	114-0047-009	16665	1
P602 P603	AND	CONNECTOR,PLUG SINGER PART NO. 168-4015-001	UG-913/U	81349	1
P602 P603	AND	CONNECTOR,PLUG SINGER PART NO. 556016-259 USED IN M-126 ONLY	MX-1684/U	81349	1
P604 P605	AND	CONNECTOR,PLUG SINGER PART NO. 556016-247	45050	19048	1

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
P606	SAME AS J613			
P607	SAME AS P604			
P608	SAME AS P606			
P609 AND P610	SAME AS J602 /M-126/			
P611	CONNECTOR,PLUG SINGER PART NO. 168-4038-001	6001	91737	1
P612	CONNECTOR,PLUG SINGER PART NO. 556016-245	17650	19048	1
P614	CONNECTOR ASSY,15 PIN	103-0013-001	16665	1
R601	RESISTOR,FIXED,COMP, 47 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-470J	EB4705	01121	2
R602	RESISTOR,FIXED,COMP, 1K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-102J	EB1025	01121	1
R603 AND R604	RESISTOR,FIXED,COMP, 8.2K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-822J USED IN STD ONLY	HB8225	01121	1
R605	RESISTOR,FIXED,COMP, 6.8K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-682J	EB6825	01121	1
R606	SAME AS R602			
R607	SAME AS R605			
R608	SAME AS R601			
R609	RESISTOR,FIXED,COMP, 10K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-103J USED IN STD ONLY	HB1035	01121	1
R609	RESISTOR,FIXED,COMP, 1.5K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1005-152J USED IN M-126 ONLY	HB1525	01121	1
R610	RESISTOR,FIXED,COMP, 100 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-101J USED IN STD ONLY	EB1015	01121	1
R611	RESISTOR,FIXED,COMP, 10 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-100J USED IN STD ONLY	EB1005	01121	1
R612	RESISTOR,FIXED,COMP, 270 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-271J USED IN STD ONLY	EB2715	01121	1
R613	RESISTOR,FIXED,COMP, 4.7K OHMS PORM 5 PCT 1W SINGER PART NO. 151-1004-472J USED IN STD ONLY	GB4725	01121	1
R614	RESISTOR,VARIABLE, 500 OHMS,PORM 20 PCT SINGER PART NO. 151-0022-002 USED IN M-126 ONLY	TYPE L	01121	1
R615	RESISTOR,FIXED,COMP, 2.7K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-272J USED IN M-126 ONLY	EB2725	01121	1

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R620	RESISTOR,FIXED,COMP, 47K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-473J USED IN STD ONLY	EB4735	01121	2
R621	SAME AS R615 USED IN STD ONLY			
R622	RESISTOR,FIXED,COMP, 150 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-151J USED IN STD ONLY	EB1515	01121	3
R623	RESISTOR,FIXED,COMP, 4.7K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-472J USED IN STD ONLY	EB4725	01121	2
R624	RESISTOR,FIXED,COMP, 390 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-391J USED IN STD ONLY	EB3915	01121	2
R625	RESISTOR,FIXED,COMP, 100K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-104J USED IN STD ONLY	EB1045	01121	1
R628	SAME AS R623 USED IN STD ONLY			
R629	SAME AS R622			
R630	SAME AS R624			
R631	SAME AS R602			
R634	SAME AS R622			
R635	SAME AS R620			
R637	SAME AS R623			
R639	SAME AS R624			
R640	SAME AS R623			
R641	SAME AS R622			
R642	SAME AS R624			
R643	SAME AS R601			
R644	RESISTOR,FIXED,COMP, 10K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-103J	EB1035	01121	1
R645	SAME AS R622			
R646	SAME AS R620			
R647	RESISTOR,FIXED,COMP, 680 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-681J	EB6815	01121	1
R648	SAME AS R622			
R649	SAME AS R601			
R651	SAME AS R609 USED IN M-126 ONLY			
R653	SAME AS R622			
R656	RESISTOR,FIXED,COMP, 2.2K OHMS PORM 5 PCT 1/2W SINGER PART NO. 151-1003-222J	EB2225	01121	1

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
R657	RESISTOR,FIXED,COMP., 120 OHMS,PORM 5 PCT, 1/2W SINGER PART NO. 151-1003-121J	EB1215	01121	1
R658	SAME AS R601 USED IN STD ONLY			
R659	SAME AS R601			
R660	RESISTOR,VARIABLE, 5K OHMS SINGER PART NO. 556056-075	35005-2-502	80294	1
R661	RESISTOR,VARIABLE, 15 K OHMS,PORM 10 PCT,2W	151-0007-083	16665	1
R662	RESISTOR,FIXED,COMP, 62K OHMS,PORM 5 PCT 2W SINGER PART NO. 151-1003-623J	HB6235	01121	1
R663	RESISTOR,FIXED,COMP, 75 OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-750J	EB7505	01121	1
R917	SAME AS R611 USED IN M-126 ONLY			
R918	SAME AS R613 USED IN M-126 ONLY			
R919	SAME AS R610 USED IN M-126 ONLY			
R920	SAME AS R612 USED IN M-126 ONLY			
R921	SAME AS R615 USED IN M-126 ONLY			
R923	SAME AS R622 USED IN M-126 ONLY			
R924	SAME AS R620 USED IN M-126 ONLY			
R925	SAME AS R625 USED IN M-126 ONLY			
R927	SAME AS R623 USED IN M-126 ONLY			
R928	SAME AS R624			
R929 AND R930	RESISTOR,FIXED,COMP, 1.5K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-152J USED IN M-126 ONLY	EB1525	01121	1
R93U	SAME AS R647 USED IN M-126 ONLY			
R932	RESISTOR,FIXED,COMP, 330K OHMS,PORM 5 PCT 1/2W SINGER PART NO. 151-1003-334J USED IN M-126 ONLY	EB3345	01121	1
R933	SAME AS R615 USED IN M-126 ONLY			
R934	SAME AS R623 USED IN M-126 ONLY			
S601	SWITCH,ROTARY,1 SECT,2 POLE, 2 THROW	004161-001	16665	1
S602 AND S603	SWITCH,SENSITIVE, SPDT	005375-001	16665	1
V601	ELECTRON TUBE SINGER PART NO. 556027-214	5876	81349	2
V602	ELECTRON TUBE SINGER PART NO. 556027-201	6F4	81349	1
V603	SAME AS V601			
V604	ELECTRON TUBE SINGER PART NO. 556027-203	6T4	81349	1
V605	ELECTRON TUBE SINGER PART NO. 556027-092	6BQ7/A	81349	1

TABLE 6-7. PARTS LIST, MODELS T-3/NF-105 AND T-3/NF-105/M-126 (Cont'd)

Ref Symbol	Description	Manufacturer's Part Number	Mfr's Code	Maint Qty
V606 THRU V608	ELECTRON TUBE SINGER PART NO. 556027-069	6AK5	81349	3
V609 AND V610	ELECTRON TUBE SINGER PART NO. 556027-200	6BJ6	81349	2
V611	SAME AS V606 USED IN M-126 ONLY			
W601	CABLE ASSY USED IN STD ONLY	102-9200-280	16665	1
W602	CABLE ASSY	102-9200-035	16665	1
W603	CABLE ASSY	102-9200-034	16665	1
XDS601 AND XDS602	SOCKET,LAMP SINGER PART NO. 556002-291	7-05	72619	1
XV605	SOCKET,TUBE SINGER PART NO. 556024-269	TS103C01	81349	1
XV606 THRU XV610	SOCKET,TUBE SINGER PART NO. 556024-265	TS102C01	81349	1
XV611	SAME AS XV606 USED IN M-126 ONLY			

APPENDIX

A-1. SCOPE OF APPENDIX.

A-2. The purpose of this appendix is to delineate the differences between the current configuration of the Models NF-105 and NF-105/M-126 Noise and Field Intensity Meters and earlier production units. The differences covered in this appendix are listed in table A-1. Amend the instruction manual, as required, to reflect these differences by incorporating the changes detailed in paragraphs A-3 through A-17.

TABLE A-1. EQUIPMENT DIFFERENCES

Feature	Current Configuration	Earlier Production Units
Pre i-f output	Standard	Optional
Video output	Standard	Optional
X-Y output	Standard	Optional
Sine wave oscillator	Discontinued	Standard
Meter linearity	Standard	Under development
Sensitivity improvement (Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units)	Standard	Under development

A-3. PRE I-F OUTPUT.

A-4. If the tuning unit in your possession does not have a front panel PRE-I.F. connector, effect the applicable schematic diagram changes detailed in table A-2.

TABLE A-2. SCHEMATIC DIAGRAM CHANGES TO DELETE PRE I-F OUTPUT CAPABILITY

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Models T-X/NF-105 and T-X/NF-105/M-126	5-4	Delete R984, J908, P908 and J909. Change value of R948 from 330 to 470. Show R948 connected to ground.
Model T-A/NF-105	5-5	Delete cathode follower V711 and associated circuitry (C789, C835, C836, C837, J703, L719, R775, R776, R777, R779 and R780), P703 and J709.

(Cont'd)

TABLE A-2. SCHEMATIC DIAGRAM CHANGES TO DELETE PRE I-F OUTPUT CAPABILITY (Cont'd)

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Model T-A/NF-105	5-6	Same as for Model T-A/NF-105.
Model T-1/NF-105	5-7	Delete R286, R287, J8, P8 and J5.
Model T-1/NF-105/M-126	5-8	Delete R286, R287, J8, P8 and J9.
Model T-2/NF-105	5-9	Delete R272, R274, J206, P206 and J208.
Model T-2/NF-105/M-126	5-10	Delete R272, R274, J206, P206 and J210.
Model T-3/NF-105	5-11	Delete R657, R663, J611, P611 and J613.
Model T-3/NF-105/M-126	5-12	Delete R661, R663, J611, P611 and J613.

A-5. VIDEO OUTPUT.

A-6. If the basic unit in your possession does not have a front panel VIDEO OUTPUT connector, effect the following schematic diagram changes in either figure 5-2 or 5-3.

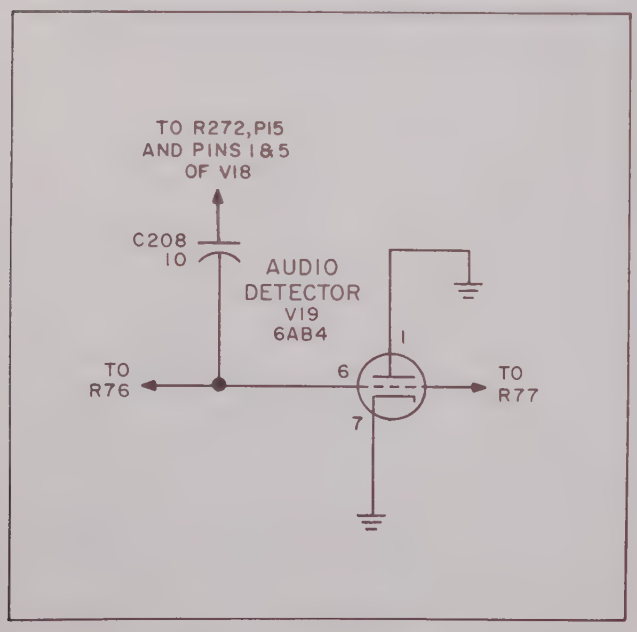


Figure A-1. Audio Detector V19 Circuit Changes

a. Delete CR4, C229 through C233, J18, R280 through R285, S9 and V19B.

b. Modify the circuitry of audio detector V19 as illustrated in figure A-1.

A-7. X-Y OUTPUT.

A-8. If your basic unit has a four-pin EXT. METER RECORDER receptacle, modify the circuitry of J17 (see figures 5-2 or 5-3) as illustrated in figure A-2. If the tuning units in your possession do not contain the x-y capability, effect the applicable schematic diagram changes detailed in table A-3.

A-9 SINE WAVE OSCILLATOR.

A-10. The original Model NF-105 Noise and Field Intensity Meter consisted of the Model BA-105 Basic Measuring Unit and the Models T-1/NF-105 (20 to 200 MHz) and T-2/NF-105 (200 to 400 MHz) Tuning Units. The basic unit incorporated a spot-frequency sine wave oscillator which generated a 100,000 microvolt rms calibration signal at a frequency of either 63 or 215 MHz, depending on the tuning unit installed. This cw signal was employed as a reference source to calibrate the equipment for narrow band measurements. Once the equipment was calibrated at the spot frequency, the impulse generator was substituted and the impulse generator output level and signal input attenuator were adjusted to obtain a convenient

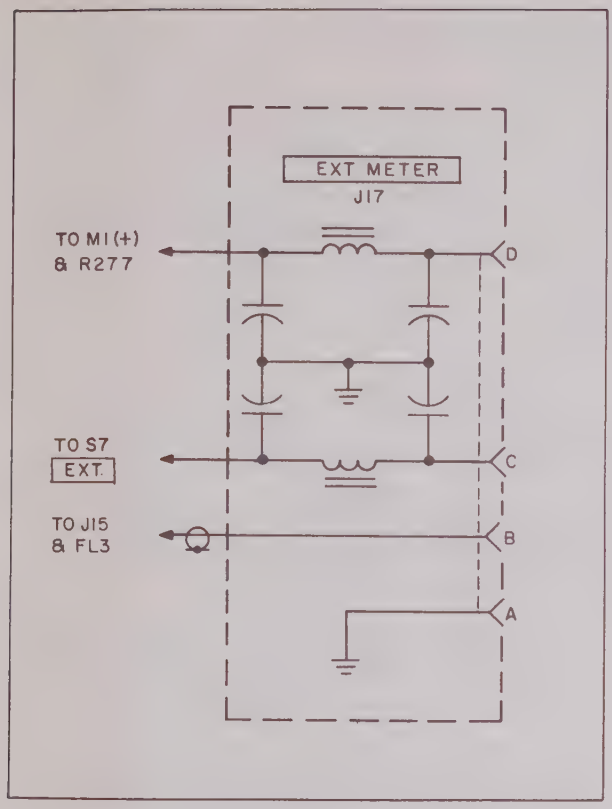


Figure A-2. EXT. METER RECORDER Receptacle Circuit Changes

output meter reference indication. The impulse generator was then employed as a transfer standard to calibrate the equipment at frequencies other than that of the sine wave oscillator.

A-11. With the subsequent addition of the Models T-X/NF-105 (14 to 150 kHz), T-A/NF-105 (150 kHz to 30 MHz) and T-3/NF-105 (400 to 1000 MHz) to the Model NF-105 system, the use of the sine wave oscillator became limited to only two of the five available tuning units. The impulse generator, with factory-supplied calibration charts, was employed as the reference calibration source for both narrow and broad band measurements since it provided a broad band signal that is flat up to 1000 MHz. (The Model T-X/NF-105 has its own impulse generator that is flat to 450 kHz.) After much considered thought, it was decided to delete the sine wave oscillator from the equipment. The pre i-f output, video output and x-y output capabilities (which were heretofore optional) were incorporated as standard features in place of the sine wave oscillator.

A-12. The schematic diagram of the sine wave oscillator and the basic unit metering and audio circuitry are illustrated in figures A-3 through A-5. The shaded areas of figures A-4 and A-5 pinpoint the circuits that were modified by the deletion of the sine wave oscillator (compare with figure 5-2). To modify the existing tuning unit schematic diagrams to show sine wave oscillator operation, make the changes specified in table A-4.

A-13. To operate the sine wave oscillator in conjunction with either the 20- to 200-MHz or

TABLE A-3. SCHEMATIC DIAGRAM CHANGES TO DELETE X-Y OUTPUT CAPABILITY

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Models T-X/NF-105 and T-X/NF-105/M-126	5-4	Delete C991, R991, R992, R993 and lead going to P912-2.
Model T-A/NF-105	5-5	Delete C875, R771, R772, R773 and lead going to P711-2.
Model T-A/NF-105/M-126	5-6	Same as for Model T-A/NF-105.
Model T-1/NF-105	5-7	Delete C228, R282, R283, R284 and lead going to P9-2.
Model T-1/NF-105/M-126	5-8	Same as for Model T-1/NF-105.
Model T-2/NF-105	5-9	Delete C60, R40, R41, R42 and lead going to P209-2.
Model T-2/NF-105/M-126	5-10	Same as for Model T-2/NF-105.

(Cont'd)

TABLE A-3. SCHEMATIC DIAGRAM CHANGES TO DELETE X-Y OUTPUT CAPABILITY (Cont'd)

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Model T-3/NF-105	5-11	Delete C702, R660, R661, R662 and lead going to P614-2.
Model T-3/NF-105/M-126	5-12	Same as for Model T-3/NF-105.

200- to 400-MHz tuning unit, perform steps a and b of paragraph 2-19 and then continue as directed below.

a. Set the Function Selector switch to CARRIER and note the output meter indication; it should read 0 on the MICROVOLTS scale. If it does not, de-energize the equipment and withdraw the basic unit (without removing the tuning unit) from the cabinet. Re-energize the equipment and, after a 15-minute warmup, adjust R10 to obtain an output meter indication of 0 on the MICROVOLTS scale. De-energize the equipment and replace into the cabinet.

b. Connect the 6-inch patch cable between the basic unit ATTEN. OUTPUT jack and the tuning unit TO ATTENUATOR jack.

c. Connect the 18-inch patch cable between the SINE WAVE OSC. and SIGNAL INPUT jacks.

d. Set the SIGNAL INPUT ATTENUATOR DB switch to 80 and set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to OFF.

e. Set the Function Selector switch to OSC. ZERO control, if necessary, to obtain an output meter indication of 0 on the MICROVOLTS scale.

f. Set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to SINE WAVE OSC. and, if necessary, adjust the OSC. LEVEL control to obtain an output meter indication of 20 on the upper DB scale.

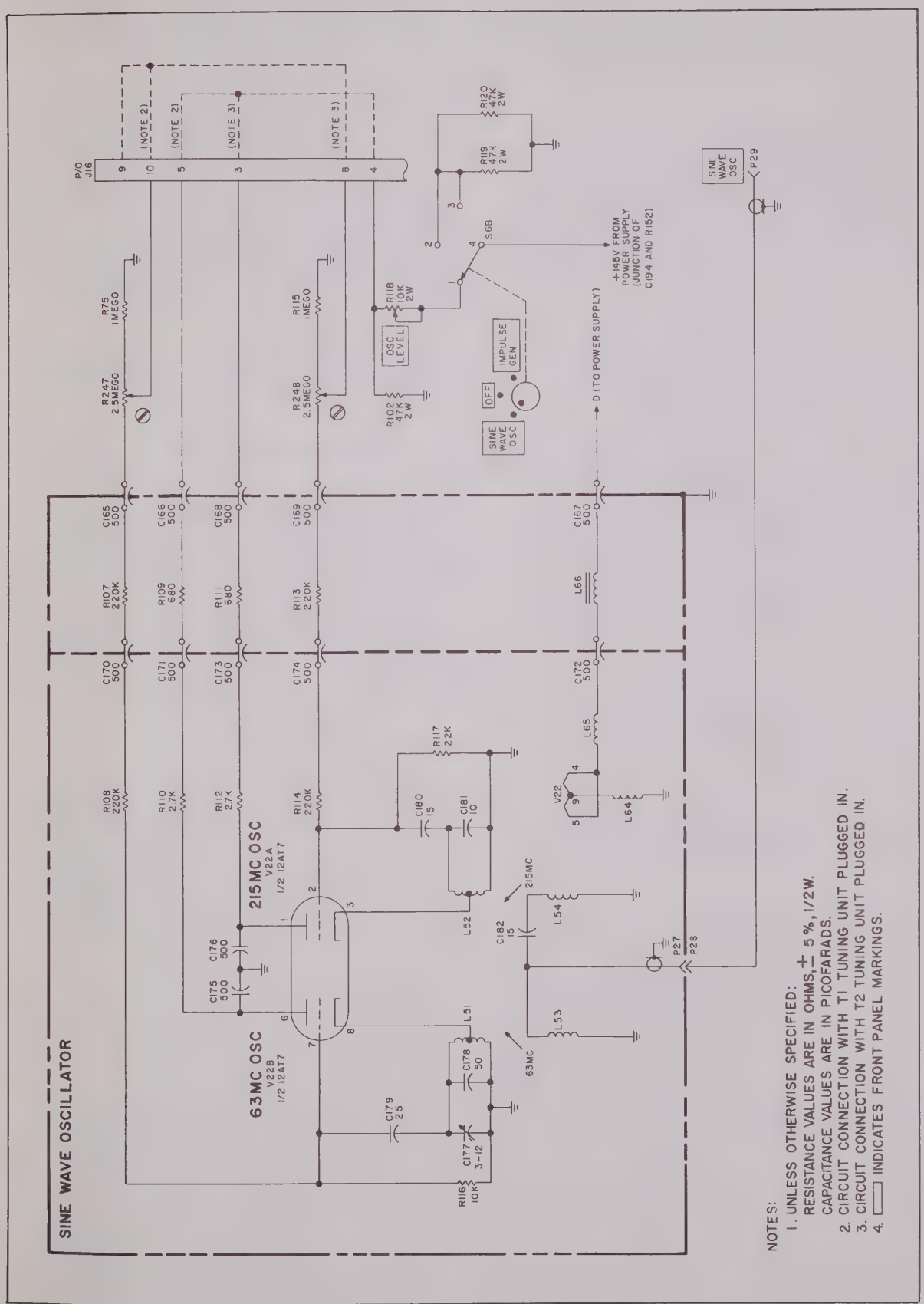
g. Set the Function Selector switch to CARRIER and rotate the TUNING control to obtain a dial indication of CAL. Rock the TUNING control to obtain a maximum output meter deflection.

h. Carefully adjust the IF GAIN control to obtain an output meter indication of 20 on the upper DB scale. The Model NF-105 is now calibrated (at the spot frequency) for a full-scale indication of 100,000 microvolts rms.

i. Set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to OFF, set the Function Selector switch to PEAK, connect the 18-inch patch cable between the basic unit IMPULSE GEN. and SIGNAL

TABLE A-4. SCHEMATIC DIAGRAM CHANGES TO REFLECT SINE WAVE OSCILLATOR CAPABILITY

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Model T-1/NF-105	5-7	Add a jumper between pins 9 and 10 of P9; add a jumper between pins 4 and 5 of P9.
Model T-1/NF-105/M-126	5-8	Same as for Model T-1/NF-105.
Model T-2/NF-105	5-9	Add a jumper between pins 8 and 9 of P902; add a jumper between pins 3 and 4 of P902.
Model T-2/NF-105/M-126	5-10	Same as for Model T-2/NF-105.



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/2W.
   CAPACITANCE VALUES ARE IN PICOFARADS.
2. CIRCUIT CONNECTION WITH T1 TUNING UNIT PLUGGED IN.
3. CIRCUIT CONNECTION WITH T2 TUNING UNIT PLUGGED IN.
4. ▭ INDICATES FRONT PANEL MARKINGS.

Figure A-3. Sine Wave Oscillator, Schematic Diagram

INPUT jacks and set the SIGNAL INPUT ATTENUATOR DB switch to 20. (If a Model T-1/NF-105/M-126 or T-2/NF-105/M-126 Tuning Unit is employed, set the SIGNAL INPUT ATTENUATOR DB switch to 0.)

j. Set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to IMPULSE GEN. and adjust the settings of both the IMPULSE GEN. OUTPUT DB ABOVE 1μV/MC switch and ADD TO IMPULSE GEN. OUTPUT control to obtain an output meter indication of 20 on the upper DB scale. Note both the setting of the IMPULSE GEN. OUTPUT DB ABOVE 1μV/MC switch and the ADD TO IMPULSE GEN. OUTPUT meter.

Note

When using the Model T-1/NF-105 or T-1/NF-105/M-126 Tuning Unit, perform steps b through j above for both calibration frequencies.

k. Set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to OFF, set the Function Selector switch to CARRIER and search for the presence of signals as detailed in steps b through k of paragraph 2-27, coupling the output of the selected pickup device to the SIGNAL INPUT jack via the Model CB-105 R-f Cable Pair.

l. At an intercepted signal frequency component, calibrate the equipment as directed in the following steps.

(1) Connect the 18-inch patch cable between the basic unit SIGNAL INPUT and IMPULSE GEN. jacks, set the Function Selector switch to PEAK and set the SIGNAL INPUT ATTENUATOR DB switch to either 20 or 0, as required.

(2) Set the SINE WAVE OSC. - OFF - IMPULSE GEN. switch to IMPULSE GEN. and set the IMPULSE GEN. OUTPUT DB ABOVE 1μV/MC switch and ADD TO IMPULSE GEN. OUTPUT control as noted in step j above.

(3) Adjust the IF GAIN control to obtain an output meter indication of 20 on the upper DB scale, set the SINE WAVE OSC. - OFF- IMPULSE GEN. switch to OFF and couple the pickup device to the basic unit SIGNAL INPUT jack.

m. Set the Function Selector switch to CARRIER and adjust the SIGNAL INPUT ATTENUATOR DB switch to obtain an on-scale output meter indication. The rms value of the signal under measurement is equal to the algebraic sum of the appropriate output meter DB scale indication, the setting of the SIGNAL INPUT ATTENUATOR DB switch, the setting of the SUBTRACT 10DB (for Model BA-105 Basic Measuring Unit) or M-126/105/SUBTRACT 10DB switch (for Model BA-105/M-126 Basic Measuring Unit), the cable attenuation and the appropriate pickup device factor.

n. Repeat steps l and m for the remaining intercepted signal components within the band of the tuning unit.

A-14. METER LINEARITY.

A-15. Current tuning units operate with +250 volts as the plate supply for the output stage(s) of the i-f amplifier for improved meter linearity. If the tuning unit in your possession has either (1) no lead at pin 8 of the multipin connector or (2) a jumper between pins 8 and 9 of the multipin connector, the i-f amplifier output stage(s) is (are) operating from a +150 volt plate supply. Incorporate the changes specified in table A-5 to modify the existing schematic diagrams to reflect operation from a +150 volt plate supply.

A-16. SENSITIVITY IMPROVEMENT.

A-17. The current production runs of the Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Units have improved sensitivities because the grounding points of the input sections have been relocated to eliminate ground loops. To modify the existing schematic diagram to reflect those units which are not so constructed, incorporate the changes illustrated by the shaded areas of figure A-11 into figure 5-4.

TABLE A-5. SCHEMATIC DIAGRAM CHANGES TO REFLECT OPERATION FROM A +150 VOLT PLATE SUPPLY

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Model T-X/NF-105 and T-X/NF-105/M-126	5-4	Delete R983, C989 and C990 and the lead from C990 to J912-8. Modify the schematic diagram as illustrated in figure A-6.
Model T-A/NF-105	5-5	Delete R781, C786, C787 and C788 and the lead from both C787 and C788 to P711-8. Modify the schematic diagram as illustrated in figure A7.

TABLE A-5. SCHEMATIC DIAGRAM CHANGES TO REFLECT OPERATION FROM A +150 VOLT PLATE SUPPLY (Cont'd)

Tuning Unit	Applicable Schematic Figure No.	Changes to Be Made
Model T-A/NF-105/M-126	5-6	Same as for Model T-A/NF-105.
Model T-1/NF-105	5-7	Delete R190, C226 and C227 and the lead from C226 to P9-8. Modify the schematic diagram as illustrated in figure A-8.
Model T-1/NF-105/M-126	5-8	Delete R199, C132 and C152 and the lead from C152 to P9-8. Modify the schematic diagram as illustrated in figure A-8.
Model T-2/NF-105	5-9	Delete R204, C230 and C235 and the lead from C230 to P209-8. Modify the schematic diagram as illustrated in figure A-9.
Model T-2/NF-105/M-126	5-10	Delete R204, C230 and C235 and the lead from C230 to P211-8. Modify the schematic diagram as illustrated in figure A-9.
Model T-3/NF-105	5-11	Delete C690 and the lead from C690 to P614-8. Modify the schematic diagram as illustrated in figure A-10.
Model T-3/NF-105/M-126	5-12	Same as for Model NF-105.

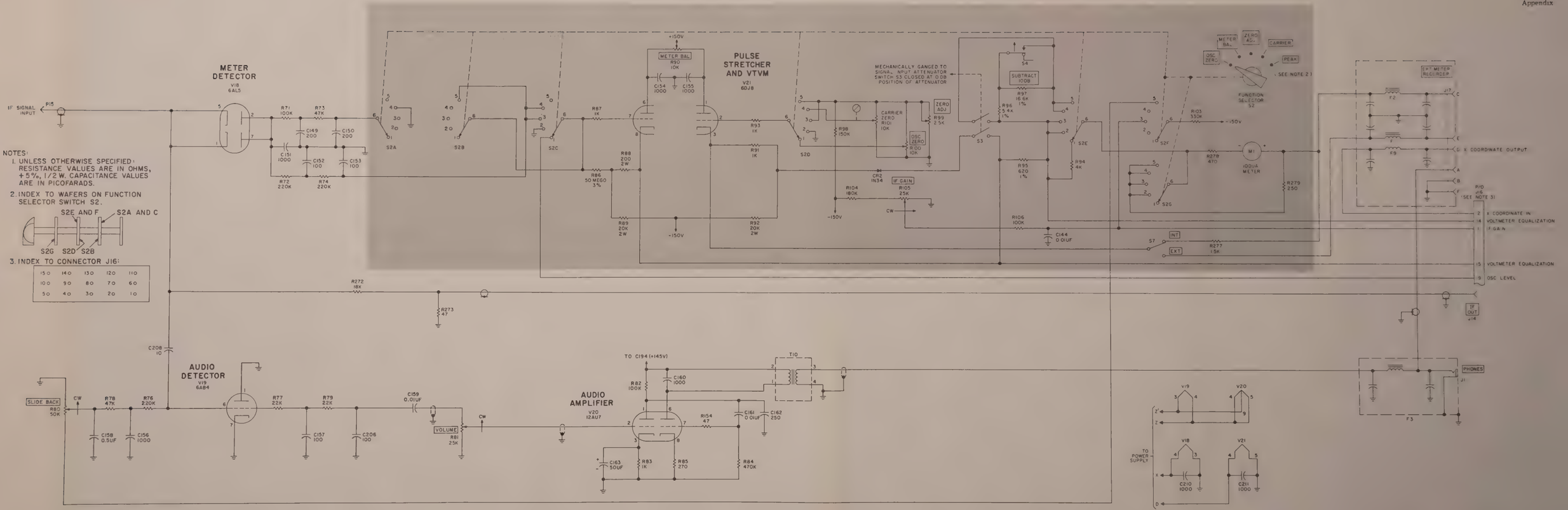
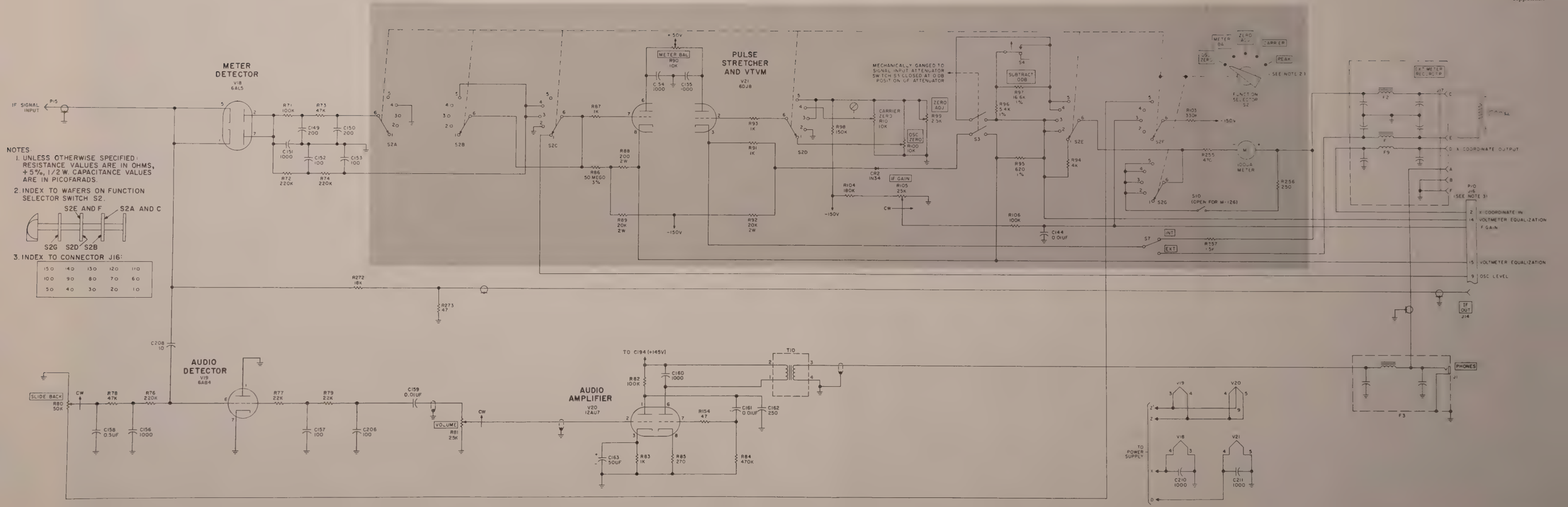


Figure A-4. Model BA-105 Basic Measuring Unit Metering and Audio Circuitry, Schematic Diagram



NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS, +5%, 1/2W. CAPACITANCE VALUES ARE IN PICOFARADS.
2. INDEX TO WAFERS ON FUNCTION SELECTOR SWITCH S2.

3. INDEX TO CONNECTOR J16:

150	140	130	120	110
100	90	80	70	60
50	40	30	20	10

Figure A-5. Model BA-105 M-126 Basic Measuring Unit Metering and Audio Circuitry, Schematic Diagram

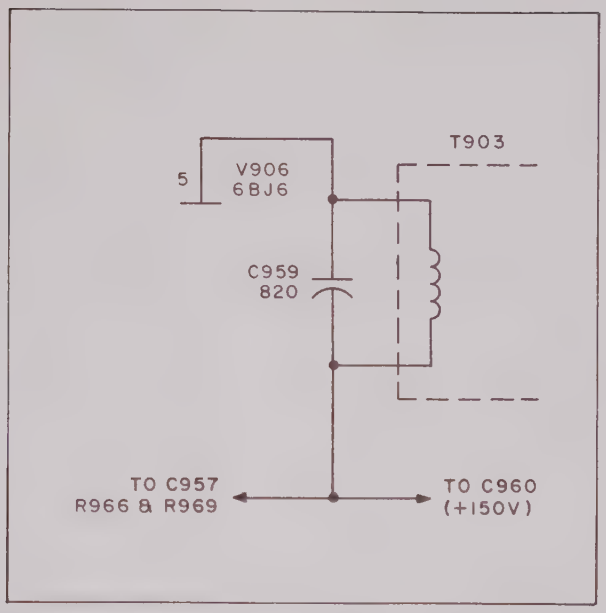


Figure A-6. Changes to Be Incorporated into Models T-X/NF-105 and T-X/NF-105/M-126 Tuning Unit Schematic Diagrams to Reflect Operation from a +150 Volt Plate Supply

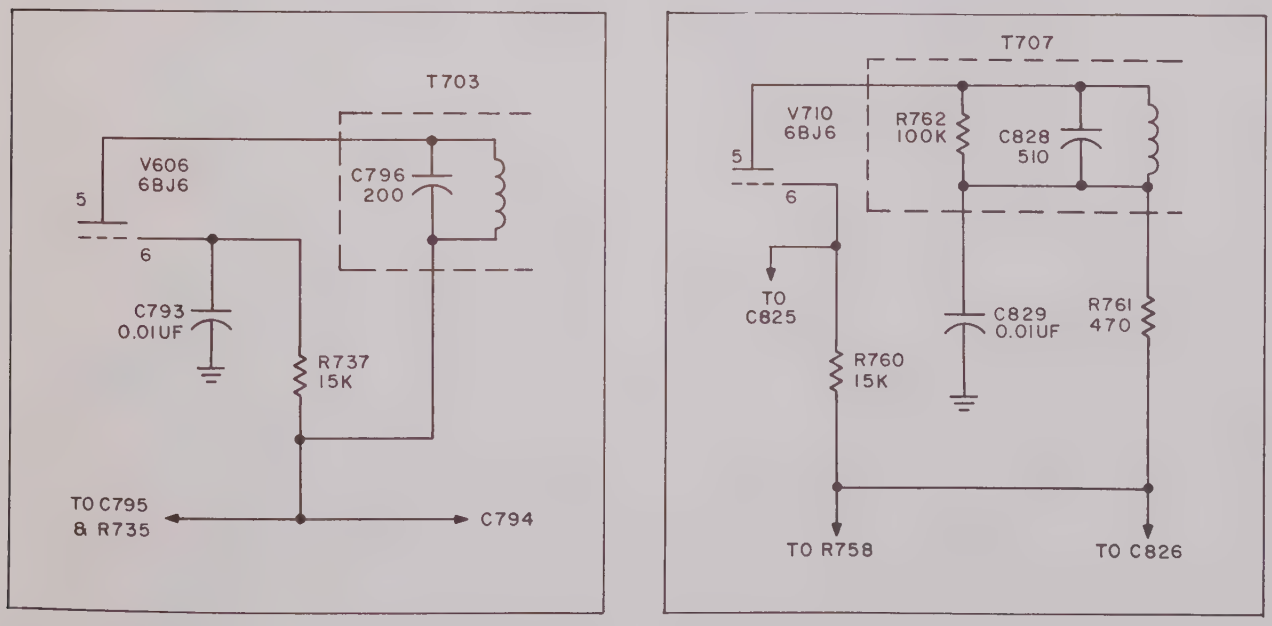


Figure A-7. Changes to Be Incorporated into Models T-A/NF-105 and T-A/NF-105/M-126 Tuning Unit Schematic Diagrams to Reflect Operation from a +150 Volt Plate Supply

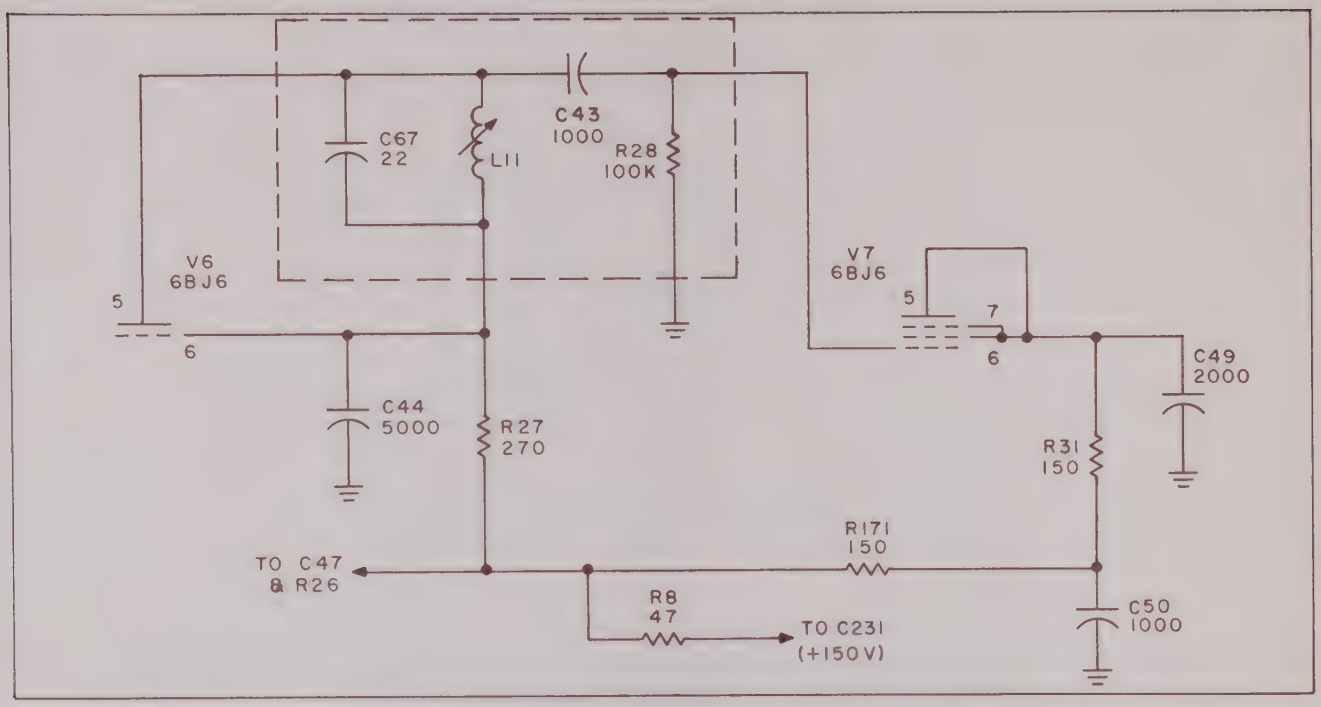


Figure A-8. Changes to Be Incorporated into Models T-1/NF-105 and T-1/NF-105/M-126 Tuning Unit Schematic Diagrams to Reflect Operation from a +150 Volt Plate Supply

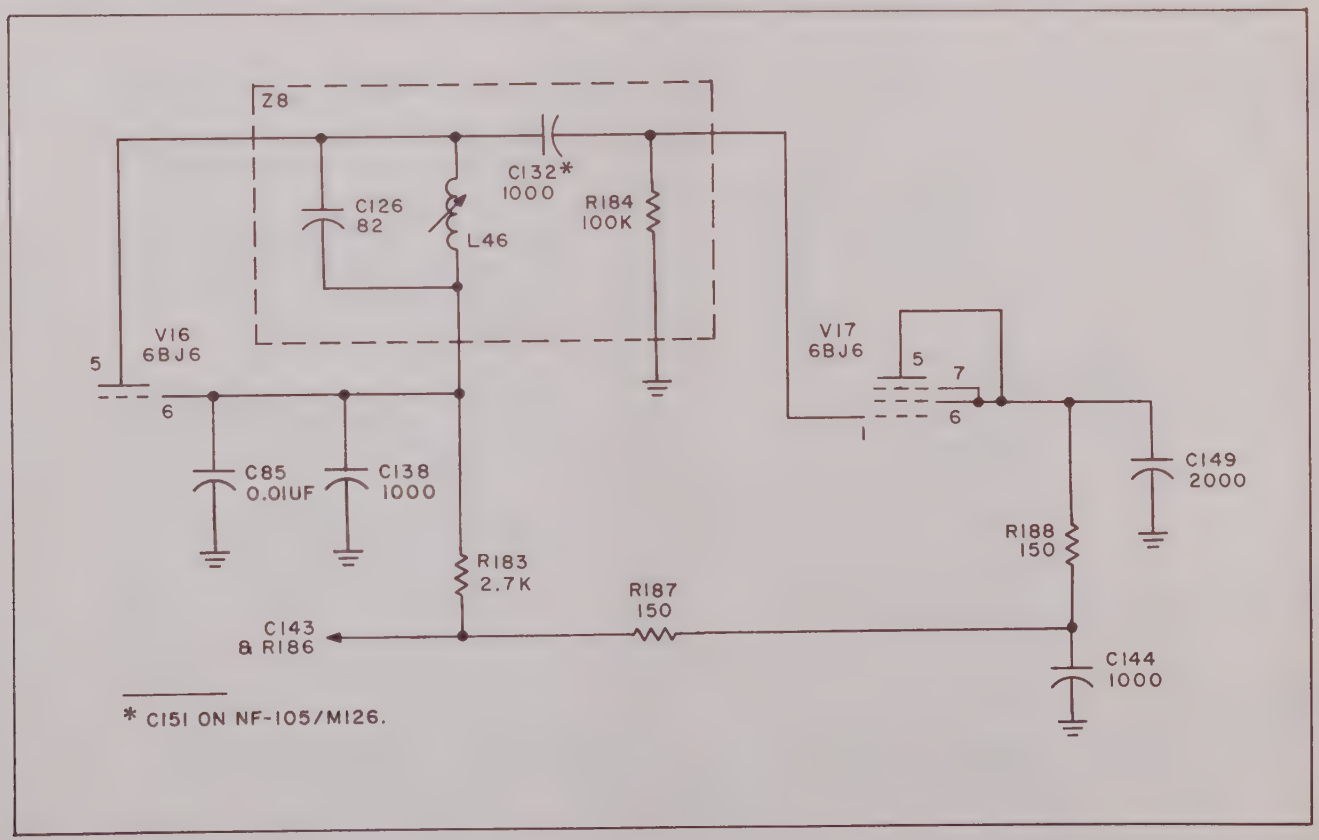


Figure A-9. Changes to Be Incorporated into Models T-2/NF-105 and T-2/NF-105/M-126 Tuning Unit Schematic Diagrams to Reflect Operation from a +150 Volt Plate Supply

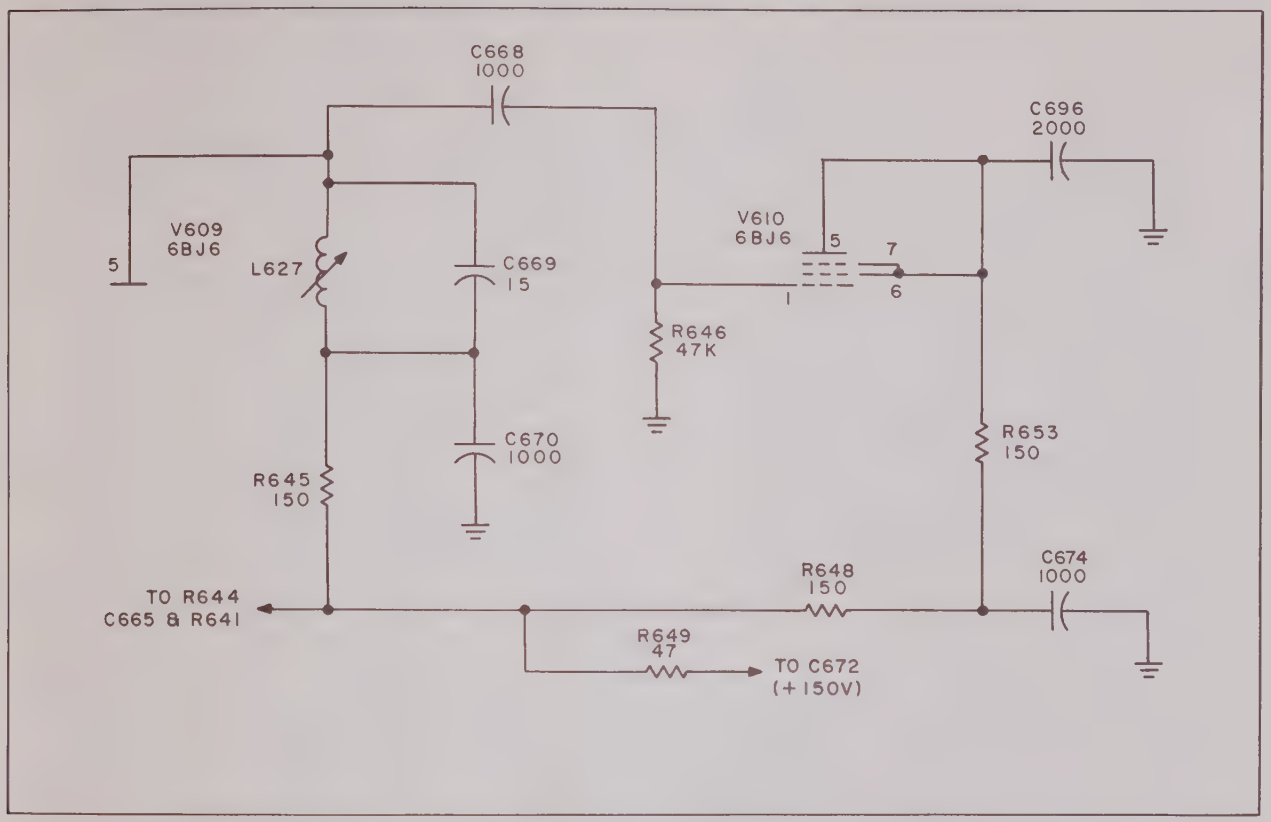


Figure A-10. Changes to Be Incorporated into Models T-3/NF-105 and T-3/NF-105/M-126 Tuning Unit Schematic Diagrams to Reflect Operation from a +150 Volt Plate Supply

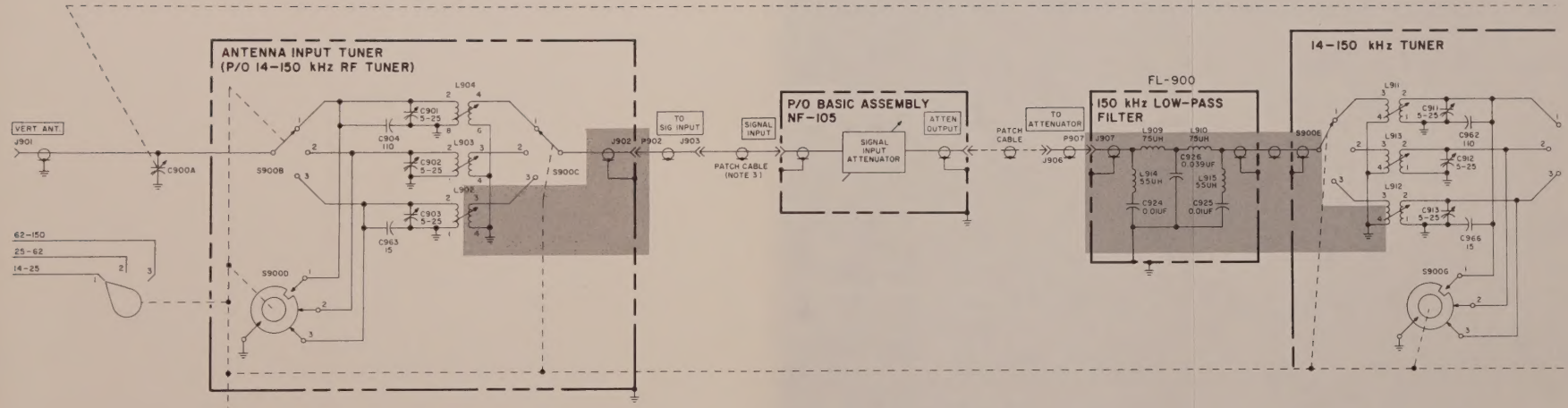
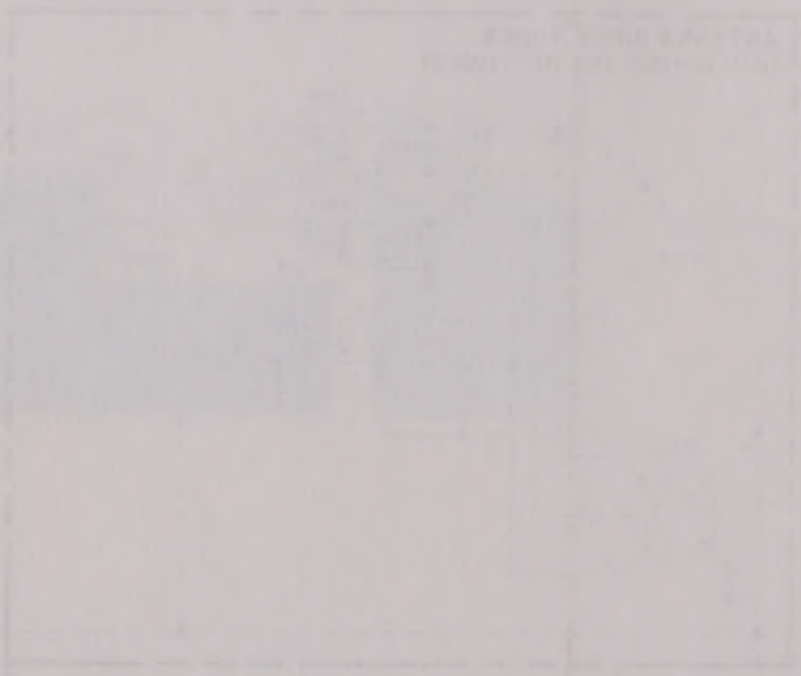



Figure A-11. Changes to Be Made to Reflect Grounding of Input Section